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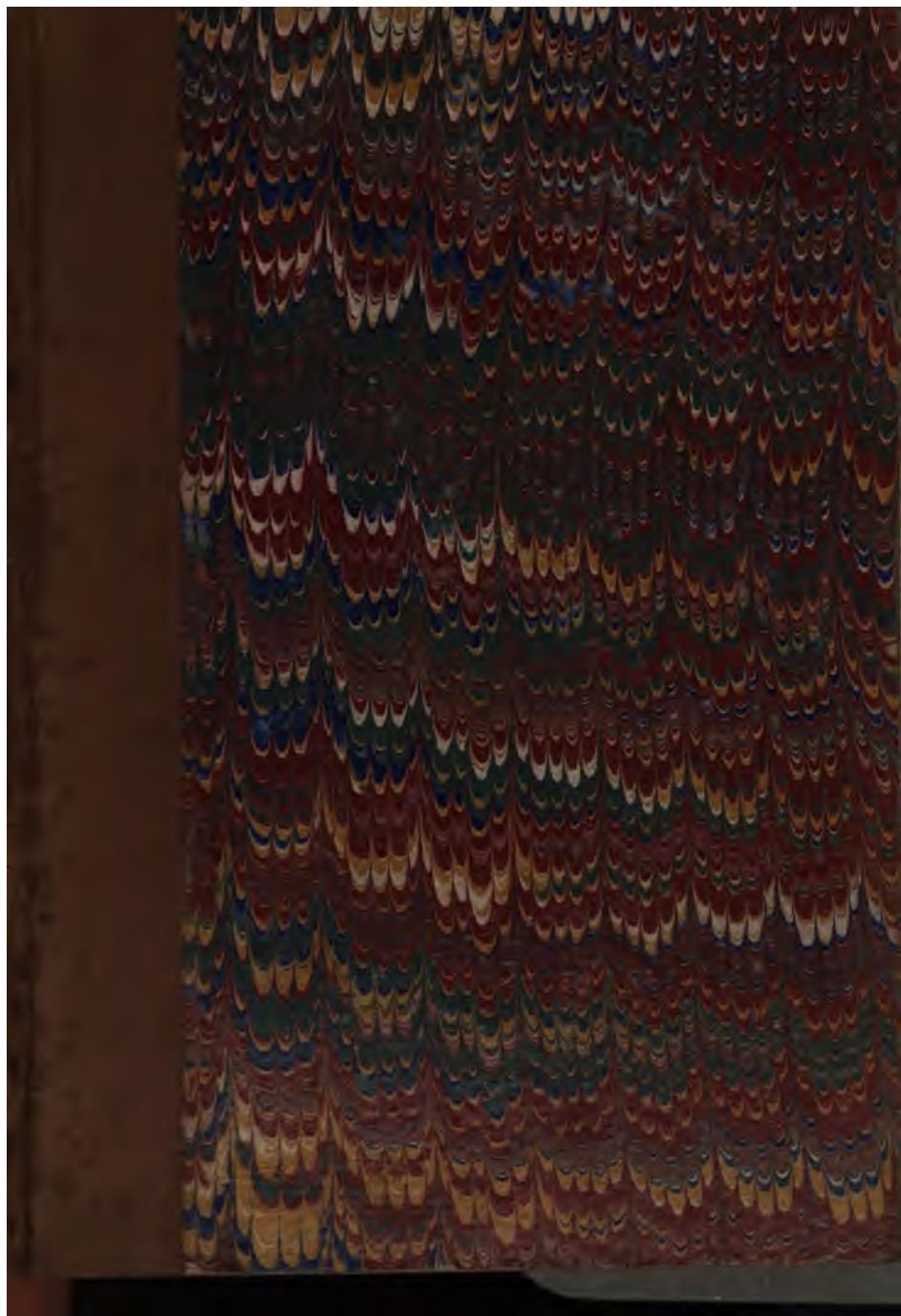
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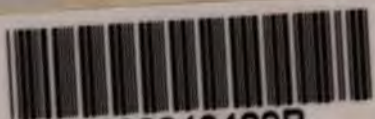
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pt. 22 / 1







PATENTS FOR INVENTIONS.

ABRIDGMENTS

OF THE

Specifications

RELATING TO

BRICKS AND TILES.

PRINTED BY ORDER OF THE COMMISSIONERS OF PATENTS.



LONDON:

PRINTED BY GEORGE E. EYRE AND WILLIAM SPOTTISWOODE,

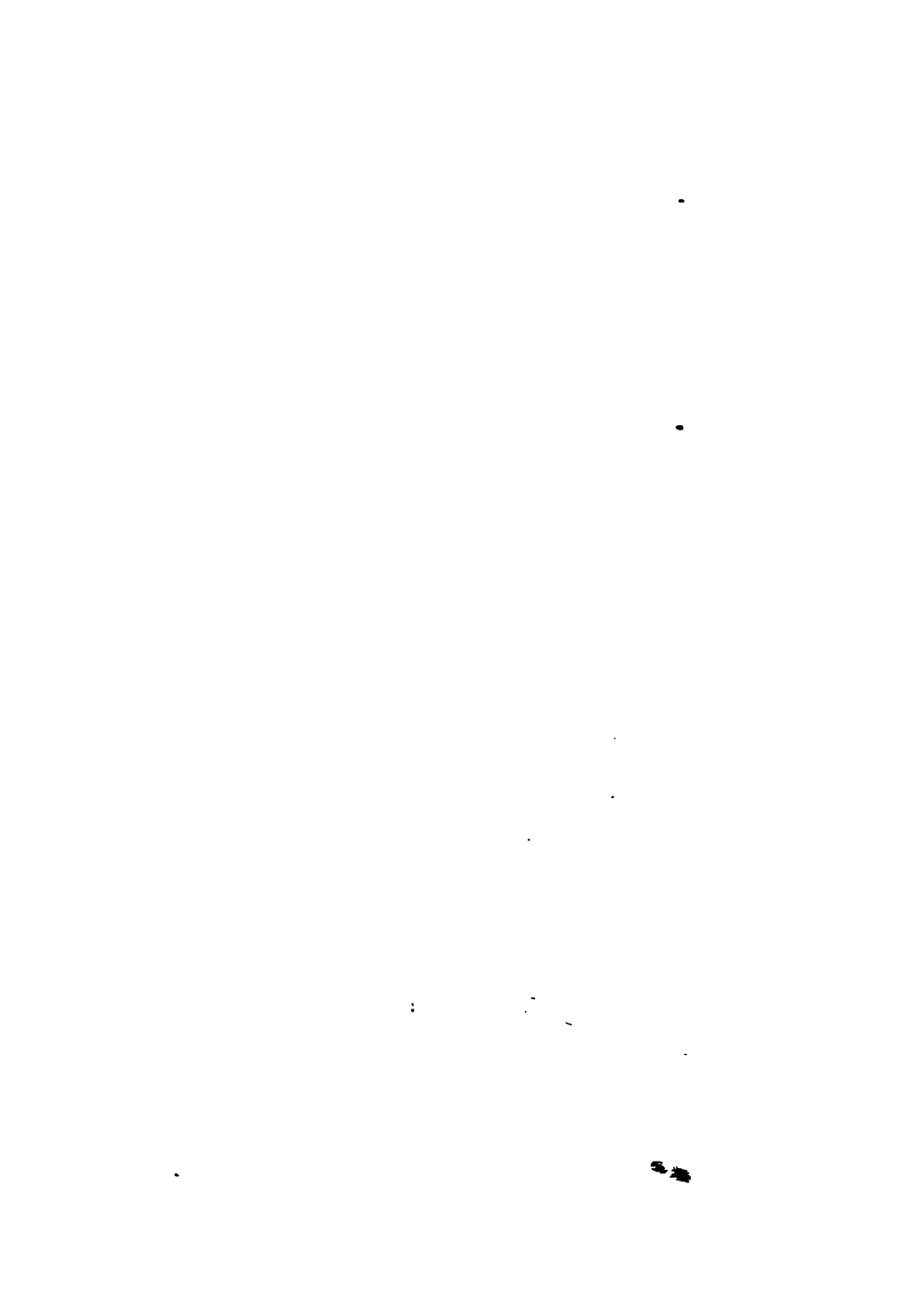
PRINTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY.

PUBLISHED AT THE GREAT SEAL PATENT OFFICE,

25, SOUTHAMPTON BUILDINGS, HOLBORN.

1862.

176 i. 8.



P R E F A C E.

THE Indexes to Patents are now so numerous and costly, as to be placed beyond the reach of a large number of inventors and others, to whom they have become indispensable.

To obviate this difficulty, short abstracts or abridgments of the Specifications of Patents under each head of Invention have been prepared for publication separately, and so arranged as to form at once a Chronological, Subject-matter, Reference, and Alphabetical Index to the class to which they relate. As these publications do not supersede the necessity for consulting the Specifications, the prices at which the latter are sold have been added.

Many Specifications being yet unpublished, the only guide in discriminating subjects in such cases has been the titles of Patents, which are frequently defective, and may therefore have led to an occasional omission.

When the entire series of Specifications shall have been printed, it is intended to publish a new and complete edition of these Abridgments; meanwhile the manifest usefulness of such works, and the urgency of the demand for copies, have been considered a sufficient justification for the present issue.

The present series of Abridgments of Specifications relative to Bricks and Tiles comprises the inventions relating to different varieties of these articles themselves, together with those referring to the materials from which

they are manufactured, the methods of forming them, and the various contrivances for drying and burning them, and includes inventions relative to artificial Building Blocks of various forms and dimensions. Many of these embrace improvements in the manufacture of Drain Tiles and Pipes, and were consequently noticed in the series of Abridgments relative to that subject ; though this is not, of course, the case with such as have appeared subsequent to the publication of that series. A limited number of the present Abridgments relate to improvements in Building Contrivances or Materials which will form the subjects of distinct series ; they were, however, necessarily included here because some portion of them refers to Bricks or Tiles.

B. WOODCROFT.

February 1862.

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INTRODUCTION.

THE art of the brickmaker has been practised by nearly every civilized nation of which we have any record; the manufacture of bricks, and the employment of them for building purposes, dating from the remotest antiquity, and the use of that distinctive form of bricks to which we have given the name of tiles being probably almost, if not quite, as ancient. Nor is this to be wondered at when it is recollected that in all countries where timber or stone are difficult to procure or to work, the natural resource must be the employment, as a building material, of baked or sun-dried earth or clay, in some shape. In such districts or provinces, however, as furnish stones of portable dimensions, or accessible and easily-worked quarries, and in such as abound in timber, the building art has often made great progress without recourse being had to artificial materials; and in these localities, bricks being little needed, are often almost unknown, and sometimes even tiles are little employed. Portions of Norway and of Switzerland may be referred to as furnishing examples either of the exclusive use of timber or of its employment in conjunction with only a small quantity of stone for structures. Certain districts of France in the middle ages, and some parts of the north of England and Scotland at the present day, furnish on the other hand instances of the almost universal employment of stone with just so much timber as is indispensable, in each case to the exclusion of brick; but exceptional localities such as these afford almost the only instances of the total absence from buildings of some form or other of artificial building roofing or paving materials.

The Babylonians, the Egyptians, and the Assyrians, among the nations of remote antiquity, all made use of bricks, to a great extent, and in the Bible references to this material as made among all of these nations, are to be found. These references form the earliest authentic accounts of the employment of bricks, but Josephus mentions a tradition which attributes to the sons of Seth a knowledge of their use, and which, if true, would thus

carry back their origin to the very earliest period of the history of the human race.

The first mention of bricks in Scripture is to be found in the account (Genesis xi. 3, 4) of the building of the city and tower of Babel. Here the making and burning of bricks is spoken of as the first work undertaken preparatory to building, and it is worth remark that the writer incidentally betrays the fact that he was writing at a time and in a place where stone was principally, if not exclusively employed, for he says "brick had they for stone."

The next Scripture mention of bricks occurs in the account of the bondage of the Israelites in the land of Egypt (Exod. i. 13, 14, and v. 6-19). Here we have an account of the employment of the captives in the manufacture of bricks, and also in the erection of buildings for Pharaoh.

In the history of David (2 Samuel xii. 31), we have a reference to a brick-kiln, not, however, in the territory of the Jews, but in the adjoining country of the Ammonites; for it is in that history recorded that having taken Rabbah, the capital of that country, David, beside other modes of destroying or humiliating the inhabitants, "made them to pass through the brick-kiln."

In the book of Isaiah bricks are twice mentioned, and in both cases in such a way as to show that they were held in low estimation as compared with stone. In the first of these passages (Isaiah ix. 10), the prophet says that the people "say in the pride" and stoutness of heart, the bricks are fallen down, but we will "build with hewn stones." In the second passage (Isaiah lxv. 3), a long series of gross breaches of law and propriety are being recited, and among the first of them occurs the reproach that the people "burneth incense upon altars of brick."

In the book of Jeremiah we have again a reference, at a date about eight centuries after the one in the book of Exodus, to the brick-making of Egypt. The Jews at that time had fled into Egypt, and the prophet, who was among them, being about to proclaim the destruction by fire of the gods of the Egyptians, was thus directed; (Jeremiah xliii. 9) "take great stones in thine hand, and hide them in the clay in the brick kiln, which is at the entry of Pharaoh's house in Tahpenes."

Lastly, in the book of Nahum, there occurs a reference to the city of Nineveh (Nahum iii. 14), from which it is clear that *bricks were understood to be the ordinary material applicable to*

the fortifications of that city. Foretelling invasion and attack, the prophet says "draw thee waters for the siege, fortify thy strong-holds; go into clay and tread the mortar, make strong the "brick-kiln." And these references to the customary employment of brick by the Babylonians, the Ninevites, and the Egyptians will be found corroborated by the accounts of profane historians, such as Herodotus and Xenophon, and by the researches of modern discoverers.

Among these three nations the use of two sorts of bricks, some being kiln-burnt and others merely dried in the sun, appears to have been general; the employment of glazed or enamelled bricks as a decoration for the face of walls appears also to have been common both at Nineveh and Babylon, and an immense number of glazed and coloured bricks exist among the ruins of both these cities.

Many ancient bricks show marks of having had reeds or other such substances worked up along with the material of which they were made, apparently to render it more tenacious. The Scripture account of the brick making performed by the Israelites in Egypt, already referred to, shows that they were compelled to employ straw in forming the bricks they made. It was also, for many ages, customary to stamp each brick with a device, or an inscription, or both, a circumstance which has afforded much useful historical information as to the date and occasion of the erection of the buildings from the ruins of which they come; thus, for example, Mr. Layard was enabled to identify the celebrated "Birs "Nimroud" as the ruin of a building of Nebuchadnezzar, by finding that every brick removed from that mound was impressed with his name. Egyptian bricks are usually inscribed, and it was enjoined by law (Smith's Dict. Antiquities, *art.* Later) upon the Romans that the bricks they made should be thus marked. Bricks so inscribed have been found in our own country, at York, and bear marks showing the presence of certain Roman legions, for or by whom they were made. The same thing has occurred in Germany, at Cærlon (Dict. of Arch. Pub. Society, *art.* Bricks.)

Herodotus, describing the building of the walls of Babylon, says, "they made bricks of the earth, borne out from the trenches, "and having drawn out a suitable quantity, they burnt them in "furnaces." This is said to be the earliest reference, in profane history, to the subject; many subsequent ones might, however,

be adduced, relating both to the works of the earlier nations already named, and to those of the Greeks and Romans. Many specimens of inscribed bricks, the Assyrian ones being impressed with inscriptions in cuneiform characters, and the Egyptian ones with hieroglyphics, may be seen in the British Museum. For a full account of the manufacture, as practised by the Egyptians, with an engraving from a celebrated painting in a tomb at Thebes, representing the process, and for illustrations of the almost universal employment of this material consult Sir Gardiner Wilkinson's Works; (Ancient Egyptians, vol. ii., pp. 97, 98; also Manners and Customs of the Egyptians.)

The Greeks appear to have built less in brick than the Egyptians or the Romans, yet it is clear that they did employ bricks to a considerable extent. Pliny informs us that the Greeks made four sizes of them, and Vitruvius also refers to the same fact. The Romans are known to have employed brick most extensively, and have left many remains of brickwork in every part of their dominions. On this point a reliable authority observes (Dict. of Arch. Pub. Soc.), "Examples might be multiplied of the mention of bricks by Greek writers," and adds, "The mention of bricks is very frequent among the Latin authors, especially Columella *De Re Rust.*, lib. ix., l. 2, 6, 4; Varro, lib. i., l. 4, 4; Pliny, *Hist. Nat.*, lib. vii., 57, xxxv., 48, 49; and Vitruvius, particularly lib. i., cap. 5, lib. ii., cap. 8, who also, lib. ii., cap. 3, devotes an entire chapter to this subject;" also "Palladius, apud Scriptores, *Rei Rusticæ.*" The bricks of the Romans, and, no doubt, those of the Greeks also, closely resembled our tiles, being flat and hard burnt, and ordinarily of a red colour; Egyptian and Babylonian bricks resemble more closely those in common use in our own country, both in their proportions and in colour, being frequently pale.

Some of the largest masses now remaining of Roman work, executed entirely in bricks, are to be seen at Rome on the Palatine Hill, and in the ruins of the Baths of Caracalla, but the most ordinary manner of employing bricks in Roman work was not to build with them alone, but to introduce them in bonding courses alternating with courses of loose rubble work, and as voussoirs in turning arches over openings, or in relieving arches; instances of this are universally visible in Roman remains, now that the masonry or cement with which such walls were most frequently

chamber of a kiln, the interstices being filled with powdered charcoal, and are to be closed in hermetically. Fires being kept up for four or five days under and around this chamber, the charcoal will be found to have given to the tiles the required colour and hardness.

The glazed tiles are to be made and dried like common tiles, then coated with a paste containing, in specific proportions, lead ore, burnt flints, and clay, all pulverized and strained through a silk sieve, and they are then to be burned in a common kiln, but with a greater heat than common.

[Printed, 5*l*. Drawings.]

A.D. 1777, February 28.—N^o 1147.

TURNER, ROBERT.—Making pan or flat tiles similar and equal to the Dutch grey and blue tiles made in Holland. The tiles are to be made and dried precisely as in the case of common red tiles, and are to be burned in a kiln for three days. At the end of this time all the cinders, &c. are to be raked out of the kiln, and a mixture of coal, kelp, “soapers’ waste ashes,” and refuse salt is to be introduced at the fire holes, after which all openings in the kiln are to be tightly closed up. The composition volatilized by the heat, hardens the tiles and changes their colour, so that when the kiln is opened after four days, they are found to be of the quality desired.

[Printed, 8*l*. Drawings.]

A.D. 1791, May 17.—N^o 1806.

PARKER, JAMES.—The nature of this invention is described by its inventor in the following words:—“My method for burning of “bricks and tiles and calcining chalk, earth, stone, and limestone, is “with peat or bog, which I make use of as fuel for the purposes “before mentioned.” The peat, cut into sods and dried in the sun, is to be employed alone or mixed with an equal weight of other combustibles in ordinary kilns or clamps, care being taken in charging them to leave proper air channels. For calcining chalk, &c., the peat is to be reduced to small lumps and laid in alternately with the material to be calcined; and in the same kiln bricks and tiles may also be burned.

[Printed, 3*l*. No drawings. See Rolls Chapel Reports, 6th Report, p. 145.]

central Europe, including Denmark, Brandenburg, part of Poland, and the north of Prussia, are noted for ancient brick buildings. Of this region Brandenburg appears to have been a sort of centre, and here examples of ancient brickwork, extending from the 12th to the 16th centuries, inclusive, can be examined. (See Essenwein, *Norddeutschland's Backstein Bau im Mittelalter*, and Adler *Mittelalterliche Backstein Banwerke des Preussischen Staates*.) Marienburg, Danzig, Lubeck, and Schwerin, may be mentioned as containing remarkable brick buildings, secular and ecclesiastic. Nearly all the brick buildings of Germany now remaining are Gothic, and some among them are very elaborate, as, for instance, the church of St. Catherine at Brandenburg, of which the richest portion (the chapel of the Holy Sepulchre) was built at the end of the 14th century, and executed in variously coloured bricks, enriched with a profusion of intricate tracery, also executed in brick and hardly surpassed in elaboration by any stone tracery of the same period. The excellence of the Dutch and Flemish bricks and tiles is well known, and they were formerly imported to this country in considerable numbers.

In France (Viollet le Duc, *Dictionnaire d'Architecture, arts, Brique, Carrelage*, De Caumont *Abeceario*) the use of bricks was introduced by the Romans, and under them and in the Merovignian period they were frequently employed in conjunction with stone, as already described; but after the ninth century bricks are rarely found in France mixed with other materials; where used they occur alone. In the south of France, however, brickwork with stone dressings is found as in the church of St. Sernin at Toulouse, built in the 12th century, and in other churches of that city. In Languedoc, a province where stone was almost entirely deficient, buildings of the 13th and 14th centuries are found built almost exclusively of brick, but this material was very rarely employed during those centuries in other parts of France. Specimens, however, exist at Toulouse, Alby, Moissac, &c. Bricks enamelled of different colours were, moreover, often employed at this period for interior linings to walls, and brick was also made use of with excellent effect in filling in the spaces in timber framed constructions.

At Moulins in the Bourbonnaise, walls in ornamental brickwork are found which date from the 15th century; they are executed in bricks of various colours laid with thick beds of a mortar of extraordinary strength.

In the succeeding century, the 16th, brickwork mixed with stone came much into use in France, and from that century to the present day this manner of building has been extensively made use of in that country. In some of the castles of the 16th century for example the Chateau de Livet (see De Caumont), a species of chequered work of bricks of several colours alternating with blocks of stone has been adopted for the walls, and harmonizes well with the variegated and enamelled tiles for roofs and enamelled bricks for floors, which by that time had come into use. Parts of the chateaux of Blois and Fontainebleau may be cited as effective examples of the mixture of brick and stonework.

The earliest paving tiles known in France are those discovered at St. Denis. The pavements there were formed of very small pieces of tiles measuring not more than $1\frac{1}{2}$ inch square, and closely resembling ancient mosaic. Enamelled tiles are found in the paving of some churches in France, dating from as far back as the middle of the 11th century, but the number of specimens remaining from that and the 12th century is extremely small. In the 13th century the mosaic floorings just referred to were replaced by tiles encrusted with ornaments. Some tiles of this period had a sunk pattern simply impressed upon them, and it seems probable that those first manufactured were of this nature, and that the practice of filling up this impressed pattern with clay of a different colour and glazing the whole was a subsequent step in the manufacture. In the 14th and 15th centuries tile pavings became very extensively employed, and in some of them comparatively small squares of inlaid and enamelled tile are combined to form patterns of large size and of the greatest richness and beauty. Of these the most celebrated is a rich paving in the church of St. Pierre sur Dive. In some instances monumental effigies were formed of encaustic tiles.

In the 15th century tiles with patterns in relief were employed in France for paving, and in the 16th century enamelled and coloured tiles came into general use for roofs; plain tiles having, no doubt, been long employed for the same purpose. These ornamental glazed roofing tiles have continued in use in parts of Germany and France to the present day.

Ornamental finials and crestings in tile and terra-cotta were frequently made use of in connexion with these glazed roofing tiles, and were many of them of a highly elaborate character of work.

Turning to our own country, it appears that the Romans introduced the manufacture and use of bricks and tiles into England, and they are constantly met with among the Roman remains. There is, however, reason to believe that, although tiles for roofing and flooring probably continued to be manufactured, few bricks, if any, were produced in England from the Roman time till the end of the thirteenth century, for where bricks occur in buildings erected during that period they seem to have been always plundered from the ruins of some Roman building, and commonly have pieces of the Roman mortar adhering to them. This is the case at Dover Castle Church; St. Martin's, Canterbury; Darent Church, Kent; Barnack; Colchester Castle, and in other instances. It is related (by Matthew Paris) that the Saxon abbots of St. Albans, having been obliged through famine to sell the store of materials they had collected for the purpose of rebuilding the Abbey church, the Norman abbot had recourse (A.D. 1077) to the Roman bricks which were to be found in the adjacent city of Verulam, and that with these he built the church. They still exist and are visible in portions of the structure.

"The earliest existing edifice of modern bricks is said to be the Hall at little Wenham, Suffolk. This is dated about 1260 or 1280. A good description, with illustrations, is given by Turner, *Domestic Arch.*, 8vo., London, 1851, p. 151, who seems to think that the earliest brick buildings of this period were the work of Flemings, or at least were built of Flemish bricks. The bond very much resembles what is called Yorkshire, or flying bond. After this period the use of bricks became more and more common, especially in those countries where stone is scarce. Norfolk and Suffolk contain many beautiful examples of mediæval brickwork, as Caistor Castle. In many places after the Reformation it seems almost to have superseded the use of stone." (Dict. of Arch. Pub. Society.)

Tiles for roofing seem to have been in use in this country at a very early period, so much so that in taking down part of an old Norman building in Southwark, at the time when the approaches to New London bridge were formed, tiles were found built into the wall which had indubitably been constructed for use as roofing tiles.

The most ancient ornamental flooring tiles found in this country appears to belong to the 13th century; and numerous examples

dating from the 14th and 15th centuries are found. Few of the remaining pavements exhibit large and elaborate patterns formed of a combination of small pieces; their usual character being a repetition of a pattern of small size, sometimes contained on a single tile, and at other times formed by the combination of four or six, or eight, or some other small number of tiles.

In the 15th century (A.D. 1477) the manufacture of tiles was of importance enough in England to require regulation by a statute (stat. 17. Edw. iv., cap. 4); and tiles dating from the middle of this century (A.D. 1453 to 1456) occur at Great Malvern, where they were employed as a decorative lining to the wall of the chancel round the high altar. In the 16th century the manufacture seems to have declined, and the use of English tiles is said to have been superseded by the importation of Flanders tiles. (*Glossary of Arch. Art. Tiles.*)

Much excellent and curious brickwork of the 17th and some of the succeeding century exists in various parts of England, the ornamental portions being partly executed in moulded bricks and partly enriched by carving done on the brickwork after it has been built up.

The duty levied upon bricks was first imposed A.D. 1784, at a rate of 2s. per 1,000, and continued in force, but at higher rates, till a recent period.

From the simple nature of the material, fewer instances of unusual varieties and of special modes of manufacture are met with than occur in many other branches of manufacture. Pliny (Nat. Hist. lib. xxxv. c. 14) mentions bricks light enough to float in water, and Fabbroni discovered a substance at Castel del Piano, a spot between Tuscany and the Papal dominions, capable of being made into such bricks. Porous bricks, which will float in water, are said to have been employed, on account of their lightness, in the vault of St. Sophia, at Constantinople; and in some of the Roman vaults hollow bricks were used on the same account. Similar bricks, devised and manufactured expressly for the purpose, were employed in turning the great vault over St. George's Hall, Liverpool.

Most of the steps in the history of the introduction of machinery for the manufacture of bricks can be traced in the accompanying series of specifications. Perhaps the most important invention relating to brick-making, the first introduction of which is not there recorded, is that of mixing ashes (technically called *soil*)

with the brick earth, and the employment of coarser ashes in the burning of bricks. The discovery that the refuse of coal fires could be thus utilized has proved of the greatest importance, especially to the brickmakers of the district round London, but when or by whom that discovery was made is now quite unknown.

A comprehensive and very complete account of the manufacture, properties, dimensions, and uses of bricks is to be found in the articles already repeatedly quoted in the Dictionary of the Architectural Publication Society, under the heads Brick, Brickmaking, &c., and references will be found in those articles to most of the publications from which further information may be gained. In addition to some of the works already mentioned in the foregoing notice, these references include the following works:—Seroux d'Agincourt, *Receuil des fragmens en terre cuite*, Paris, 1814; Bakewell, *Observations on Building and Brickmaking*, 12mo., Manchester, 1834; Wedke and Romberg, *die Baumaterial-lehre*, 4to., Leipzig; Dobson, *Rudimentary Treatise on the Manufacture of Bricks*, 12mo., London, 1850; Rondélet, *Traité théorique*, 10th edit. 4to., Paris, 1852, and *Supplement*, by Blouet, 1836; Delonge, *Art. de Briquetier*; Simons, *Account of Brickmaking at Bletchingley Tunnel*, 1840-41, given in Civil Engineers' Journal, vi. 348., and Clere, *Essai pratique sur l'art du Briquetier*, 8vo. Paris. 1828.

BRICKS AND TILES.

A.D. 1619, January 28.—N^o 11.

ETHERINGTON, JOHN.—“A spial priviledge graunted to John Etherington, shewing that whereas he hath found out “The arte of making a certain engine to make and cast clay, of alle sorte of earthen pipes for conveyance of water in the earth, and also monions and transomes for windowes, crests for houses, tyles and paving-stones,” his Ma^{tie} doth hereby graunt unto him sole power, for 21 yeares, to make and use the said engines for the purposes aforesaid, paying yearlie unto his Ma^{ties} Exchequer, xxvj^s viij^d.”

[No Specification enrolled. Letters Patent printed, price 3d.]

A.D. 1630, August 13.—N^o 51.

BALL, EDWARD; LASSELL, EDWARD; HAMPTON, ROBERT, and ANLEY, WILLIAM.—“The meanes soe to prepare and order the fuell of peate or turffe by reduceing into a coal, that it shall serve for the makeing, melting, forging, and fyneing of iron, lead, and tynn, and for boyleing of salt, and for the burning of bricke, tyle, and lyme, or any other thing whatsoever for building, or otherwise, to bee made of earthe, without the addiçon or use of any wood, charcoale, pit coale, or sea coale.”

[No Specification enrolled. Letters Patent printed, 4d.]

A.D. 1632, June 20.—N^o 59.

GRENT, THOMAS.—Includes a variety of inventions :

1. Moving ships without wind.
 2. Fish call.
 3. “A water bowe.”
 4. “The fourth, a buildinge moulde or stone presse, very requi-
- B. & T. A

A.D. 1808, January 26.—N° 3103.

STEWART, WILLIAM.—Improvements in machinery for making bricks and tiles.

In this machine there is a pug mill; and a series of moulds suitable for bricks or for tiles, as the case may be, and so linked together as to form an endless chain, are caused to pass through the bottom of this pug mill to be charged with clay. The improvements specially claimed are:—

1. That the central axis of the pug mill is supported without any pivot at the bottom of the mill, thus leaving space for the moulds.

2. That the moulds are driven by the “first mover” of the pug mill, and in such a way that a certain ratio between the rate of speed of the mill and of the moulds is maintained, whatever the actual speed.

3. Carrying the moulds by means of, or in the manner of, an endless chain passing over polygonal rollers.

4. Causing part of each mould to slide upon the rest to facilitate the removal of the bricks. This occurs as each mould passing over the polygonal roller after being filled, one side or other part being moveable and so attached to the previous mould that when the link connecting these two moulds is bent in passing over the roller, the moveable part shall slide upon the rest and shall loosen the bricks, which drop out, and are removed by hand on a board.

[Printed, 9d. Drawings. See Rolls Chapel Reports, 7th Report, p. 199.]

A.D. 1809, September 29.—N° 3269.

WHITE, JOHN, the younger.—Employing for the manufacture of bricks, tiles, or other articles of pottery the deposit or siltage of the Thames near London, such samples being selected as are most free from worms or aquatic animals and most plastic, and the mass being placed before use on a bank or support where the water may drain from it. This material to be employed either alone or mixed with such proportions of natural clay and sand, or either of them, as may be needful for the manufacture of the above-named articles.

[Printed, 3d. No drawings. See Repertory of Arts, vol. 18 (*second series*), p. 200; and Rolls Chapel Reports, 7th Report, p. 205.]

A.D. 1810, March 22.—N° 3319.

DEYERLEIN, JOHANN GEORGE.—Machinery for expressing plastic material through moulding orifices, to form bricks, tiles, tubes, pipes, or other articles. "The same doth consist in a box " or receptacle into which the clay is to be put, and also a plug " or plunger or forcing instrument, by means of which the said " clay is forced onwards during working so as to urge the same " through one or more suitable openings or orifices," the box being refilled after each stroke of the piston. The clay so brought to the required section is received on barrows prepared for the purpose, and there cut by hand into the required lengths. For tubes a core of proper shape is fixed in the moulding orifice.

[Printed, 10d. Drawings. See Repertory of Arts, vol. 18 (*second series*), p. 259; and Rolls Chapel Reports, 7th Report, p. 203.]

A.D. 1811, August 7.—N° 3473.

GILBERT, THOMAS.—Improvements for facilitating the delivery of bricks, &c. from the moulds in which they are made. A revolving table to which intermittent motion is communicated, contains spaces for receiving the moulds for bricks, tiles, ornaments, pottery, &c., which are filled with material from a stationary tub fixed over the table. The moulded articles, after the filled moulds have been carried partly round by the table, can be removed by hand on pallet boards, and fresh pallets introduced, the moulds being constructed so as partly to open, and space enough being left to allow the hand to be introduced under the moulds.

[Printed, 8d. Drawings. See Rolls Chapel Reports, 7th Report, p. 112.]

A.D. 1813, February 20.—N° 3649.

HAMILTON, JOSEPH.—Constructing bricks or blocks of earthen building materials, of such forms, sizes, and proportions as shall be applicable to building walls, arches, floors, and other structures; but forming in them perforations running in an oblique direction, and so disposed that when the materials are put together in buildings, the perforations shall coincide with those in adjoining bricks or blocks; and also making pins, bars, bolts, or nails of the like or other suitable material, to be fixed in the said perforations, "so as to lock or connect, or firmly tie or unite, the said

"bricks, masses, lumps, or pieces together, with or without the use of mortar, cement, putty, or other similar binding or filling material."

Connecting the said earthen building materials by placing some vitrifiable substance between them as they are built up, and fluxing the same by making portions successively red hot by removeable furnaces.

[Printed, 3d. No drawings. See Repertory of Arts, vol. 26 (*second series*), p. 267; and Rolls Chapel Reports, 8th Report, p. 96.]

A.D. 1813, March 13.—N^o 3664.

DEACON, BENFORD.—This invention relates to heating or cooling air or water, and methods of conveying warm or cold air to any distance.

The portion of it relating to bricks or tiles consists of bricks with hollows formed in them, described as "peculiar formed tubical bricks," and which when laid will form tubes for the conveying air up chimneys from the kitchen fire boiler to the attics, &c., in walls or along flues, &c.

[Printed, 9d. Drawings. See Rolls Chapel Reports, 8th Report, p. 96.]

A.D. 1813, April 28.—N^o 3685.

HAMILTON, JOSEPH.—Improvements or additions to brick machines. 1. "First, in order to lessen the inconvenience which attends the withdrawing of the piston for the purpose of charging the cylinder or DOD (used in the manufacture of earthenware, bricks, or tiles) with clay or other fit materials, and also to lessen the quantity of air which usually accompanies the charge of clay or other fit materials into the said dod or cylinder, I use a screw with a sufficiently deep thread, in one or more pieces, and of a convenient diameter, by the revolutions of which screw in the cylinder or dod, on the principle of the blue makers' screw, or the pump screw, I charge the cylinder or dod at my convenience, and subject the clay or other fit materials to the necessary pressure."

2. To enable several persons to work at or about one cylinder, pipes are introduced into it, each with a stop-cock or slide, so that

each worker, having a pipe to himself, can draw off or stop his own supply of clay at his convenience without disturbing the others.

[Printed, 3d. No drawings. See Rolls Chapel Reports, 8th Report, p. 96.]

A.D. 1813, May 31.—N° 3705.

MANDER, JOHN; MANBY, AARON, and VERNON, JOSEPH. —“A method or methods of making the cinder, scoræ, slagg, “or by whatsoever name the refuse produced in the smelting or “refining of iron may be called, into forms that may be used for “any purpose to which briek, quarry tile, slate, or stone now are “or may be applied.”

This refuse is to be received from the furnace or “finery” into moulds previously heated, and shaped to give it the desired form, and the moulds are then gradually cooled in annealing flues, ovens, stoves, or chambers before the matter is taken out of them.

[Printed, 3d. No drawings. See Repertory of Arts, vol. 24 (*second series*), p. 270; and Rolls Chapel Reports, 8th Report, p. 98.]

A.D. 1814, December 15.—N° 3863.

WYATT, FRANCIS JOHN. —“New kinds of bricks or blocks.” One kind intended for facings of buildings is to be made with a thin slab or slabs of stone or marble to form the exposed face or faces, which may be laid in the mould, and the rest of the block then filled up with cement, such as will adhere to the stone and harden; or the facing may be applied to the cement when in the mould. For better bonding the bricks are to be made with a hollow on the under side and a corresponding protuberance on the other.

Building walls with one or two thin facings and filling in the back or intermediate space with “a composition of cement, sand, “rubble, or such like material. Paving blocks to be made in “the same way as the facing blocks.”

[Printed, 5d. Drawings. See Repertory of Arts, vol. 27 (*second series*), p. 237.]

A.D. 1816, April 9.—N° 4016.

ATKINSON, WILLIAM. —“A new or improved method or “methods of forming blocks with bricks and cement in the

“ form of ashlar stone for building, so as to have the appearance of stone.” The blocks are to be formed of bricks cemented together with any hard mortar or cement, with or without a mould, and may be of any size or shape preferred; they may be coated on the face with cement and finished in imitation of stone.

[Printed, 5*d.* Drawings. See Repertory of Arts, vol. 30 (*second series*), p. 75; and Rolls Chapel Reports, 8th Report, p. 113.]

A.D. 1820, June 2.—N^o 4466.

HAGUE, JOHN.—Machine for separating the “ materials for making pottery ware, tiles, and bricks,” from the stones, roots, &c. they may contain.

These materials are to be thrown into an upright box, the sides of which are perforated with holes or slits. A piston, having its face of the shape of an inverted pyramid, is worked in this box by means of a rack and cogged wheel, and in its descent forces the clay out sideways through the perforations, driving the stones, &c. to the bottom where they can be taken out through a trap door. The piston has springs at the sides to prevent any clay from passing between it and the cylinder; and when it has completed its descent, is caused to stop itself by disjoining the two parts of a clutch box which conveys motion to the cog wheel.

“ Bricks and tiles may be formed by having holes at the bottom of this machine, the size of the end of the brick or tile, to cut off with wire as it comes out of the holes.”

[Printed, 9*d.* Drawings. See Repertory of Arts, vol. 39 (*second series*), p. 263; and London Journal (*Newton's*), vol. 2, p. 21.]

A.D. 1820, June 21.—N^o 4482.

SHAW, JOHN.—“ A new method of making bricks by machinery.” In this machine clay is fed into a hopper, across which works a shaft, having rotary motion and carrying arms which beat the clay downwards into two or more clay trunks, each of the same section as a brick mould; in front of each trunk is a mould and behind it a piston fitting the same. The further side of the mould is so closed by a metal wedge, weighted, and working in a groove, that one face of it forms one side of the mould.

One of the clay trunks being charged the piston is caused to advance and drive the clay into the mould, where it is compressed

and consolidated; the pressure is then relaxed, the wedge is caused to rise, and the piston advancing further expels the brick on to an endless web. The piston is then drawn back to allow the entrance of another charge of clay, and the wedge is allowed to fall. Should the brick not have been previously completely detached, the inclined side of the wedge in falling will throw it on to the web.

The whole of these motions are effected by a shaft carrying an eccentric with studs, which act upon four suitably arranged levers, of which one, a compound lever, brings forward the piston with great pressure; a second raises the wedge, unclosing the mould; a third causes the second advance of the piston to expel the brick; and the fourth draws back the piston and restores the compound lever to its original position.

[Printed, 1s. 1d. Drawings. See London Journal (*Newton's*), vol. 2, p. 23.]

A.D. 1820, November 1.—N° 4507.

WRIGHT, LEMUEL WELLMAN.—Machinery for moulding bricks and tiles. In this machine clay of a stiff and firm consistence is fed into a hopper or hoppers, and falls thence into an upright mould charger, where from time to time a piston descends and forces it into the moulds beneath. A steel plate is next caused to pass between the clay in the moulds, and that in the mould charger to sever the one from the other, and the moulds are then moved by the action of the machine under a compressor; this descends, carrying on its face a plunger for each mould, consolidates the moulded article, and is then partly withdrawn. The plate upon which the mould had rested being now moved so as to leave an opening under the same, the compressor again descends and forces the bricks out downwards on to revolving endless straps or webs.

The motions are in almost all cases derived from cams keyed on to one central shaft, and acting on suitably arranged systems of levers. The moving parts are caused to return to their positions by the reaction in one case of a balance weight, in others of springs.

[Printed, 1s. 1d. Drawings. See London Journal (*Newton's*), vol. 3, p. 23.]

A.D. 1824, November 11.—N° 5036.

LEAHY, WILLIAM.—Improvements in machinery for making bricks and in the drying of them.

1. A moulding machine, in which the clay is fed into an upright conical hopper with fixed blades on its inner face, and containing other blades carried by a central shaft, to which rotary motion can be given. A circular inclined plane, revolving in a contrary direction to the blades, receives the clay and forces it into a receptacle open in front and behind. In front of the receptacle is a vertical wheel with the moulds on its periphery; at the back of it is a forcer, which from time to time advances into the receptacle and drives the clay before it into the moulds. A scraper is provided to level the faces of the bricks as they pass before it in succession, and the moulds have moveable bottoms, which are caused to thrust out the finished bricks on to boards, which travel through the lower part of the machine upon endless chains.

2. A drying house, with proper stages, &c. for the bricks, and flues of brick or iron, or steam pipes for causing hot air or steam to circulate.

[Printed, 1s. 1d. Drawings. See Repertory of Arts, vol. 1 (*third series*), p. 415; London Journal (*Newton's*), vol. 12, p. 129; and Register of Arts and Sciences, vol. 3, pp. 82 and 105.]

A.D. 1824, November 20.—N° 5039.

RHODES, WILLIAM.—An improved method of constructing clamps for burning raw bricks, the object of which is to produce a greater quantity of good sound bricks out of a clamp, than by the ordinary method. The clamps to be built in the usual manner, but instead of being so covered with topping or finishing courses that the moisture drawn out of the bricks by the heat cannot pass off, the upper course of raw bricks is to be "skintled," or laid with intervals between all the bricks, and tunnels or pigeon holes are to be formed in the covering or finishing courses; so that "there is at all times a free and open vent and escape for any steam or vapour that may arise in the body of the clamp or kiln." The invention also "consists in obtaining a more perfect and impervious covering for the clamp or kiln in wet seasons by the use of brick rubbish or soil."

[Printed, 3d. No drawings. See Repertory of Arts, vol. 1 (*third series*), p. 275; London Journal (*Newton's*), vol. 11, p. 18; and Register of Arts and Sciences, vol. 3, p. 105.]

A.D. 1825, February 1.—N° 5086.

LEE, EDWARD, and HARRISON, GEORGE.—A machine for moulding bricks or tiles. In this machine the clay is prepared in a pug mill, the arms of which express it downwards and outwards, and it leaves the mill through two openings on opposite sides, each opening giving access to a clay chamber, and being adjustable in size to regulate the supply. At intervals a piston descends in the chamber and forces down out of it clay enough to fill one mould. The moulds, carried by two endless chains side by side passing under the clay chambers, have an intermitting motion and in opposite directions, and deliver bricks at both ends of the machine. A cutter severs the clay after each mould has been filled, and the moulds, as they are taken off one chain with the bricks in them are emptied, and sanded, and are then replaced on the other chain so as to pass through the machine in an opposite direction. "The manners of effecting the different movements" in the machine as shown on the drawings are claimed by the inventors.

[Printed, 1s. 1d. See Repertory of Arts, vol. 2 (*third series*), p. 188; and London Journal (*Newton's*), vol. 12, p. 180.]

A.D. 1825, May 14.—N° 5161.

ELLISS, EDWARD.—Substituting for bricks, as a building material, blocks of the stone or chalk "commonly called and known " by the name of 'grey stone chalk'" cut or sawn to the same dimensions.

[Printed, 3d. No drawings. See London Journal (*Newton's*), vol. 11, p. 90; and Register of Arts and Sciences, vol. 3, p. 230; also vol. 1 (*new series*), p. 281.]

A.D. 1825, May 14.—N° 5166.

GALLOWAY, ALEXANDER.—A brick machine. In this machine there is fixed a horizontal table with two openings, and below one of these openings is a chamber with a piston in it having an upward stroke. Above this table rotates a circular plate containing three or more sets of brick moulds, open at the bottom, and with pistons, held up by spiral springs, at the top. Between each set of moulds is a hopper, open at top and bottom, and capable of containing sufficient clay exactly to fill one set of moulds. In work-

ing, when a hopper has been filled, the rotation of the table carries it over the chamber, into which its contents fall; the further progress of the plate brings the set of empty moulds over this chamber, thus charged, and the plate remains stationary while the piston makes an upward movement, driving the clay into the moulds; the further motion of the plate then carries the moulds over a scraper and under an inclined plane, which, by forcing down the mould pistons, ejects the bricks downwards.

Two or more of these machines may be combined. The intermittent motion of the mould plate is communicated by giving it a toothed periphery gearing into a horizontal driving wheel, which has blank spaces formed by leaving out some of its teeth, and which during the passage of these blank spaces leaves the mould plate stationary.

[Printed, 102. Drawings. See Repertory of Arts, vol. 2 (*third series*), p. 129; and London Journal (*Newton's*), vol. 13, p. 126.]

A.D. 1825, June 9.—N^o 5184.

BURRIDGE, JOHN.—Improvements in bricks, having for their object the ventilation of the timbers built into walls so as to preserve them from decay. Several forms of bricks are shown and described, all having grooves or channels or bevells formed in such a manner that by the introduction of these bricks into a wall “apertures for the admission and passage of air can be so placed” or arranged that ventilation may be produced in any part of a “house at pleasure.” Any other forms of aperture may be adopted by which the same principle can be carried out.

[Printed, 62. Drawings. See Repertory of Arts (*third series*), p. 270; London Journal (*Newton's*), vol. 11, p. 172; and Register of Arts and Sciences, vol. 3, p. 23.]

A.D. 1825, August 23.—N^o 5246.

LYNE, GEORGE HENRY, and STANNIFORD, THOMAS.—The machinery for making bricks which constitutes this invention has at its centre a pug mill entirely open below and raised on a framework. A mould frame, with a double series of open moulds, traverses under the mill, so that one series of moulds is being filled while the contents of the other are being compressed and delivered.

The under sides of the moulds are formed of “temporary wooden

“ bottoms ” adjusted to correspond to the moulds and placed on a kind of moveable truck, capable of being moved away. Two series of plungers correspond to the two sets of moulds. The moulds in one set having been closed below by the temporary wooden bottoms, filled at the pug mill, and moved to one side, the plungers are caused to descend and compress the bricks. The truck with the boards is then caused by the action of the machine to drop, and the plungers force the bricks down out of the moulds on to it, and then rise again. This truck can now be wheeled away and replaced by an empty one.

Motion is communicated to the different parts by mechanism driven from the central shaft of the pug mill, as is shown on the drawings and described in detail by the inventor.

[Printed, 1s. 1d. Drawings. See Repertory of Arts, vol. 3 (*third series*), p. 43; and London Journal (*Newton's*), vol. 14, p. 177.]

A.D. 1826, April 27.—N^o 5353.

CHOICE, WILLIAM, and GIBSON, ROBERT.—Machinery for brick-making. In this machinery there are three sets of moulds fixed at the extremities of three arms that radiate from and are hinged to a vertical rotating shaft, so that the moulds are carried round by the rotary action of the shaft, but are free to rise and fall. A guide over which the arms run is made alternately to raise and lower the moulds in such a way that each set in turn is first dipped into water, then into sand, and is then brought down on to the clay which is discharged out of a pug mill on to a bottom plate, having itself a rotary motion. The moulds thus filled with clay are carried over a polishing plate to smooth the bottom of the brick, and lastly over a small framework that supports them momentarily while the bricks are forced out of them on to an endless band, upon which they are carried away.

[Printed, 6d. Drawings. See Repertory of Arts, vol. 4 (*third series*), p. 250; London Journal (*Newton's*), vol. 14, p. 366; and Register of Arts and Sciences, vol. 4, p. 97.]

A.D. 1827, May 5.—N^o 5496.

BROWNE, JOHN, and CHAMPION, WILLIAM DUDERIDGE.—Employing for the manufacture of bricks, tiles, blocks, slabs, &c. the river deposit “ which is found on the banks of the River “ Parrett in the county of Somerset,” and “ of the nature of a

"light loam or clay-like soil, plastic, or capable of being moulded into form when nearly dry," or river deposit of a similar character wherever found, carefully ground or pugged, and mixed with clay and sand, or with sand only. The proportions and quality of each material, and the method of procedure, are described in much detail, and the articles produced have a surface similar to that of Bath stone.

Also a "stock" hinged to the brick-making table, upon which the mould is to be placed, before filling, by hand. After moulding, and before removing the brick, the moulder must "turn up the stock by its hinges, with the full mould upon it, so as to turn the brick upon its side while yet in the mould."

[Printed, 4*l*. No drawings. See Repertory of Arts, vol. 6 (*third series*), p. 258; and London Journal (*Newton's*), vol. 2 (*second series*), p. 157.]

A.D. 1828, August 11.—N° 5681.

MENCKE, WILLIAM.—Improvements in the materials for bricks, and in machinery and processes for making them.

1. The ordinary brick earth having been mixed with chalk and washed, the inventor proposes to add to them a proportion of sulphuric acid to promote the combination and drying of the ingredients.

2. The moulding machine is a combination of a screw press with a hydraulic press. The moulds are fixed ones, open at top and bottom, and a series of them are placed between the two presses. The follower or head of the hydraulic press is moved up to the under side of the series of moulds, and thus closes them on that side; they are then filled from above, and the follower of the screw press is then caused to bring forcibly down upon them a series of pistons, one to each brick. After the bricks have been consolidated, the head of the hydraulic press is allowed to recede, and a further movement of the screw press forces the bricks downwards out of the moulds.

3. The bricks are first dried, and afterwards burned in arched buildings so constructed that during the drying a current of smoke and heated air can be made to pass among them.

[Printed, 9*l*. Drawings. See Repertory of Arts, vol. 9 (*third series*), p. 23; London Journal (*Newton's*), vol. 9 (*second series*), p. 65; and Register of Arts and Sciences, vol. 3 (*new series*), p. 301.]

A.D. 1829, July 4.—N° 5810.

NORTH, WILLIAM.—Constructing and employing tiles to act as a lining to ceilings and partitions, with a view to render them fire-proof. These tiles are made of composition, and the invention consists in the “method of fixing such tiles, viz., by inserting “staples into the tiles during the operation of moulding them, “placing such staples in suitable positions to receive hooks or “L-shaped irons, for the purpose of fastening the tiles to the “woodwork, and also in forming the edge of each tile, in which “there are staples overhanging and the other or opposite edge “underhanging in order to interlock and fasten behind the “edge of the tile next to it.” The hooks or L-irons are to be screwed to the rafters of the ceiling or studs of the partition, which are to be spaced to suit the widths of the tiles.

[Printed, 7d. Drawings. See Repertory of Arts, vol. 8 (*third series*), p. 649; London Journal (*Newton's*), vol. 4 (*second series*), p. 135; and Register of Arts and Sciences, vol. 4 (*new series*), p. 66.]

A.D. 1829, July 25.—N° 5820.

DRAKE, FRANCIS HORATIO NELSON.—(*a communication*).—A new form of roofing tile. In this description of tile the lower part of each tile is thicker than the upper, and the face of the tile shows a description of rebate upon which, when fixed on a roof, the tile above partly rests, so that the roof shall present one plane surface to the weather. There are also channels at the sides and on the face of each tile to conduct away such water as might be likely to lodge.

There are also tiles as a substitute for pan-tiles, made with a sort of hollow roll at one side and a channel on the other side, in which the roll of the adjoining tile can lie, and so arranged that when three tiles have been laid, the fourth shall lock the other three into their places.

[Printed, 7d. Drawings. See London Journal (*Newton's*), vol. 9 (*second series*), p. 28; and Register of Arts and Sciences, vol. 4 (*new series*), p. 228.]

A.D. 1829, November 2.—N° 5866.

COWDEROY, JOHN.—This inventor states :—“Firstly, I claim as “my invention the improved method of constructing moulds for “brick-making, such moulds being formed with joints so as to

“ permit the sides and ends to open and shut, and with a moveable centre plate to indent and detach the brick from the mould, as herein particularly described.”

“ Secondly, I claim as my invention generally the application of moulds formed with joints, whatever be their form and construction, such moulds being connected together to form an endless chain or chains of moulds working over cams or pullies applicable to the purpose of brick-making.” The moulds in the chain, after being filled, are caused, in passing over the cam partly to open at the same time that the moveable centre plate referred to above is raised, and by this combined action the bricks are delivered from the moulds.

[Printed, 10*d*. Drawings. See London Journal (*Newton's*), vol. 9 (*second series*), p. 221; and Register of Arts and Sciences, vol. 5 (*new series*), p. 15.]

A.D. 1830, January 26.—N° 5890.

WRIGHT, SAMUEL. — “A manufacture of ornamental tiles, bricks, and quarries for floors, pavements, and other purposes.” The nature of the invention consists,—

1. In employing for these articles the finer descriptions of clay so mixed and fired as to be very hard.

2. In ornamenting the tiles, &c., in various patterns and colours, by impressing the pattern and afterwards filling the indentations with clays “prepared and coloured with metallic oxides.” The impressed patterns are produced by moulding the tiles in moulds of gypsum, &c., strengthened by a metal casing. These tiles, when partly dry, are brought to a clean surface and uniform thickness by being pared down in an iron box, of which the upper edges, which serve as guides, are true and always parallel with the bottom, though the depth of the box and consequently the thickness of the finished tiles is adjustable at pleasure.

[Printed, 3*d*. No drawings. See Repertory of Arts, vol. 10 (*third series*), pp. 95, 199; London Journal (*Newton's*), vol. 6 (*second series*), p. 79; and vol. 23 (*conjoined series*), p. 463; Mechanics' Magazine, vol. 39, p. 29; Register of Arts and Sciences, vol. 5 (*new series*), p. 100; and Webster's Reports, vol. 1, p. 736.]

A.D. 1830, March 6.—N° 5917.

STEVENSON, RALPH.—Machinery for making bricks, tiles, &c. from plastic materials by expressing them through dies or moulding orifices.

In this machinery two clay boxes are provided, each mounted

on wheels on a short railway, so that they can be run out to be refilled. In the front and back of each box near the bottom openings are left, into which the dies are fitted, and a presser is brought down on to the clay by a simple arrangement of wheelwork so contrived that while the clay in one box is under pressure, the presser belonging to the other shall be elevated to admit of that box being refilled.

The continuous streams of clay pass between a pair of rollers with flanges fitted to them, the rollers serving to smooth and render parallel the upper and under faces, the flanges doing the same for the lateral faces. The clay is then cut into proper lengths, dried, and fired.

[Printed, 10d. Drawings. See London Journal (*Newton's*), vol. 5 (*conjoined series*), p. 117; and Register of Arts and Sciences, vol. 5 (*new series*), p. 136.]

A.D. 1830, May 8.—N^o 5937.

DEVENOGE, ROBERT SALOMON.—A machine for moulding bricks. In this machine, which is carried on a frame capable of being moved about on wheels, the moulds for bricks are inserted in the peripheries of two large cylinders. The clay is to be fed into a space between these two cylinders, and when necessary is to be pressed down by a weight to ensure that it shall enter the moulds. The cylinders are so arranged that when the rotation of either cylinder brings a mould with its charge of clay to that part where it will be in contact with the other cylinder, a part not pierced with a mould shall be presented to it, which will act as a presser to consolidate the brick. These moulds have all moveable bottoms, which, by the continued rotation of the cylinder, are brought into gear with sloping guides, which first move them outwards to expel the bricks, and then draw them back ready for a new charge. The bricks are received and carried away on a kind of wide endless band. There is an arrangement for sanding the emptied moulds before they are refilled.

[Printed, 10d. Drawings. See Repertory of Arts, vol. 10 (*third series*), p. 93; London Journal (*Newton's*), vol. 6 (*conjoined series*), p. 325; and Register of Arts and Sciences, vol. 5 (*new series*), p. 70.]

A.D. 1830, August 18.—N^o 5985.

BAKEWELL, SAMUEL ROSCOE.—Improvements in machinery for grinding and tempering clay and similar materials, and in presses and moulds for making bricks, tiles, &c.

The apparatus for grinding clay consists of a large shallow circular grinding pit, with a circular raised platform in the centre. A grinding wheel of large diameter, carried on a long arm and free to slide upon as well as rotate round the arm, is rolled round and round in this pit, the pivot of the arm being on the central platform and the extremity passing beyond the verge of the pit, so that horse or other power can be applied. The peculiarity of the invention is that the grinding wheel can at pleasure be caused to move in a circular or an increasing or diminishing spiral path. This is effected by being able to cause the arm to assume a position in which it does or does not radiate from the central pivot. Several contrivances for forming at pleasure the requisite bend in the arm are shown, and also a modification, in which, by the help of screws, the distance from the pivot to the wheel can be increased or diminished gradually, producing the same result.

The brick presses operate upon clay in a half dried state, one brick at a time, and are worked by hand. The mould is at the top of the machine, and clay having been filled into it from above, it is covered by a lid carried in a swinging frame, the axis of which is below. A hand lever is now worked, which at the same time draws the cover tightly on to the mould and forces up a plunger from below, to compress the brick or tile. When this pressure is relaxed and the cover removed, a second lever further elevates the plunger and ejects the article. In a modification of this machine the mould cover is held down by a fastening, and the upward pressure is given by a rack and pinion in place of levers. A spring-catch mould for making bricks by hand, capable of being opened when the brick is completed, is also shown and described.

[Printed, 2s. 4d. Drawings. See London Journal (*Newton's*), vol. 8, (*second series*), p. 113; and vol 21 (*conjoined series*), p. 479 for Disclaimer; Mechanics' Magazine, vol. 15, p. 170; Register of Arts and Sciences, vol. 6 (*new series*), p. 43; Engineers' and Architects' Journal, vol. 3, p. 160; and Rolls Chapel Reports, 7th Report, p. 133.]

A.D. 1830, February 18.—N° 5985*.

MANNING, JOHN.—Disclaimer to the Specification of Letters Patent, N° 5985, granted to Samuel Roscoe Bakewell. Those portions of Bakewell's Specification relating to mode of tempering plastic materials and to a peculiar hand mould are hereby disclaimed, and the press for bricks or tiles is retained, with the

addition that it is available for consolidating bricks already partly made by some other process.

[Printed, 3d. No drawings. See London Journal (*Newton's*), vol. 21 (*conjoined series*), p. 479.]

A.D. 1830, September 13.—N° 5998.

CHADLEY, JAMES.—This invention consists, 1. “First, in forming bricks intended for chimney flues bevelled on the inside, in such a manner as to meet the necessities of the required turns and windings of the chimney,” the “bed sides” of these bricks being flat and the height of them the same as ordinary bricks, but each one having a portion of a curve cut out of it.

2. In forming curved tiles with a rebated flange on one edge of each, “so as to form, when set one upon the other, a smooth lining for a chimney flue;” and tiles of another sort to form soffits to fire openings.

3. In forming chimney bars of cast iron, with a sloping back and a flange along the front intended to facilitate the sloping or “gathering” of the front face of the flue, and to save bricks.

[Printed, 1s. 1d. Drawings. See London Journal (*Newton's*), vol. 3 (*conjoined series*), p. 299; and Register of Arts and Sciences, vol. 6 (*new series*), p. 15.]

A.D. 1830, November 11.—N° 6035.

PRATT, HENRY.—This invention consists in forming quarries for kilns, hot-houses, &c., with oblong slots for the escape of hot air on the upper face, these slots being widened towards the bottom face of the tile, so that they present channels of a conical section. Of the bars separating these air channels some are deeper than others and some run at right angles to the others, so as to form a kind of framework to strengthen the quarry. The quarries may be either cast in metal or formed of clay in a mould.

[Printed, 6d. Drawings. See Repertory of Arts, vol. 11 (*third series*), p. 343; London Journal (*Newton's*), vol. 7 (*conjoined series*), p. 199; Register of Arts and Sciences, vol. 6 (*new series*), p. 99; and Engineers' and Mechanics' Encyclopædia, vol. 2, p. 371.]

A.D. 1832, April 13.—N° 6257.

CLARK, JOHN JAMES; NASH, JOHN, and LONGBOTTOM, JOHN.—Improvements in machinery and processes used in the

manufacture, from plastic materials, of various articles inclusive of bricks and tiles. The improvements claimed by the inventors are as follows :—

1. The employment of separate and detached open moulds fitted into cavities prepared for their reception, which moulds when filled are ejected along with the bricks they contain, and after the bricks have been removed from them are replaced by hand.

2. "The application of heaters in contact or contiguous to the " mould receivers." Spaces for red-hot iron or other heaters are left between the cavities into which the moulds fit, and the action of them is intended to promote the drying of the clay.

3. The application of springs to keep the mould receivers in contact with one another. These springs are applicable to an arrangement of moulds shown on the drawings, in which the mould receivers are ranged on the peripheries of two polygonal wheels touching one another at one point at this circumference; the bearings of their axles are free to slide in guides, and are kept pressed together by these springs.

4. "The application of cloth or other fibrous elastic or absorbent " surfaces, and the application of liquids to those substances in the " preparation of the articles before named from plastic materials, " by machinery or otherwise."

A series of knives to clean the surfaces of the moulds, and a machine for making tiles by expressing a stream of clay through a suitable opening, together with some other details of manufacture, are described in the Specification, but are not claimed as novel.

[Printed, 1s. 4d. Drawings. See London Journal (*Newton's*), vol. 6 (*conjoined series*), p. 13; *Mechanics' Magazine*, vol. 23, p. 177; and *Engineers' and Mechanics' Encyclopedia*, vol. 1, p. 259.]

A.D. 1833, February 14.—N^o 6386.

RHODES, WILLIAM.—Improvement in the preparation of brick earth. In place of "soiling" brick earth used in making brick with the ingredients commonly employed, such as "ashes, or " what is called London soil, small coal, or a mixture of these " substances," or else a mixture of unpulverized coke, ashes, and London soil, the inventor employs finely pulverized coke only, or pulverized coke mixed with other fining for this purpose. "The

fineness of the sieve (which is to be kept always dry) through which the coke ought to be fit to pass is shown full size on the illustrative drawings.

[Printed, 5*d*. Drawings. See Repertory of Arts, vol. 16 (*third series*), p. 142; and London Journal (*Newton's*), vol. 4 (*conjoined series*), p. 113.]

A.D. 1833, May 11.—N° 6422.

SPINNEY, THOMAS.—This invention is stated to be “essentially the combination of clay, sand, and fire-clay for the manufacture of crucibles, melting pots, and fire-bricks.”

[Printed, 3*d*. No drawings. See London Journal (*Newton's*), vol. 7 (*conjoined series*), p. 97.]

A.D. 1833, May 25.—N° 6426.

BEART, ROBERT.—This invention relates to the manufacture of tiles by the help of moulds of a peculiar construction. These moulds are deep, and open at top and bottom, and present a horizontal section similar to the outline of the intended tiles; they are to be charged with clay either by hand or from a pug mill, and some of the clay being, by means of a piston below, forced out of the top of the mould to a height equal to the thickness of a tile, a cutting instrument is run across by hand which cuts off the tile. The back of this instrument is fitted to act as a “strike or level,” and the surface of the clay having been smoothed by it, a further movement is given to the piston, and so on till the box is emptied.

In the arrangement described and shown on the drawings two moulds are provided, of which one is being filled at a pug mill, while the other is emptied, and the piston is raised or lowered by means of a screw set in motion by pinions worked by hand; but the pistons may, if preferred, remain stationary, the mould will in that case be lowered on to them by means of a rack and pinion, or in any other convenient way.

[Printed, 5*d*. Drawings. See Repertory of Arts, vol. 1 (*new series*), p. 11; and London Journal (*Newton's*), vol. 4 (*conjoined series*), p. 86.]

A.D. 1834, October 22.—N° 6701.

PLENEY, JEAN BAPTISTE.—Apparatus for moulding and cutting bricks and other articles made of brick earth. In this appa-

thus the brick earth is moved forward on a "bed or table," propelled by an endless band travelling under part of it, and is compressed under three successive rollers, one large and two small, which cause it to assume the form of a sheet of clay of the exact thickness of a brick. Two vertical wires are fixed at the sides of the bed and near the third roller, which cut this sheet to a width exactly equal to the length of a brick. A wire also crosses the machine just under the large compressing cylinder to scrape and cleanse it. The clay is carried by the same means and on the same bed from the compressing cylinders under a moveable "cutting frame," beneath which are arranged wires crossing the bed of the machine at distances apart equal to the width of a brick. By means of a lever this frame can be caused to descend, and as it does so it depresses the wires, which, however, being fixed to the machine at one end and weighted at the other, have a drawing action communicated to them across the brick earth at the same time that they are brought down, thus facilitating their cutting. After the frame has been raised, the bricks, still on the bed, can, if wished, be carried to any distance to be dried along an inclined plane fitted with rollers.

For articles curved or moulded in section, rollers made to give the required section are substituted for the plain flat compressing rollers; and the distance apart of the cutting wires can be regulated so as to cut the clay into any desired lengths.

[Printed, 10*d*. Drawings. See Repertory of Arts, vol. 4 (*new series*), p. 20; and London Journal (*Newton's*), vol. 13 (*conjoined series*), p. 158.]

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A.D. 1834, December 23.—N^o 6738.

BEART, ROBERT.—This "invention consists in mounting an "ordinary brick mould on an axis at one end in such manner "that it may be turned over and the brick caused to be delivered "therefrom by means of a piston, which at the time of filling in "the brick earth constitutes the bottom of the mould."

The mould is open at the top, and is filled, and the top of the clay in it is levelled in the usual way. The axis on which the mould turns is fixed at such a height above the table forming the top of the machine, that when turned over there shall be room for the brick to drop, when forced out by pressing down the

bottom of the mould, now uppermost. This moveable bottom or piston is to be of metal, and its face is to be covered with a bit of the skin of the horse with the hair on, or with woollen cloth or other similar material. The whole is arranged to be worked by hand.

[Printed, 6d. Drawings. See Repertory of Arts, vol. 4 (*new series*), p. 200; and London Journal (*Newton's*), vol. 7 (*conjoined series*), p. 158.]

A.D. 1835, August 10.—N° 6876.

JONES, EDWARD.—“Improvements in machinery for moulding
“bricks, tiles, and other articles of brick earth.”

1. An arrangement of machinery in which the moulds form a series carried near the circumference of a circular or other frame fixed horizontally; each mould has a moveable piston at the bottom of it, a friction roller being connected with each piston. Upon these pistons loose palletts are laid, and the clay being filled into the moulds by a pug mill or by hand, and compressed under a roller, the working of the machine carries the moulds over an inclined track, upon which the friction rollers work, so that the pistons are raised and the palletts, with the bricks on them, can be removed and fresh ones substituted.

2. A different arrangement of machinery in which the moulds are fixed in a frame, which slides up and down on guides. Pistons, one to each mould, are provided above the moulds, and have vertical play; below them is the fixed bed of the machine. Connecting rods worked by cams, cranks, or eccentrics from a main shaft convey motion to both moulds and pistons. A board with palletts, one for each mould, is first placed on the bed of the machine; the moulds then descend on to these palletts, and are by hand charged with clay; the pistons next descend and compress the clay, after which the mould frame rises away from the bricks, which are held down by the pistons. Subsequently the pistons also rise, and the board carrying the bricks, each on its own pallett, is slid out, and a fresh one introduced. If desired, the moulds may be arranged to descend in place of rising, the brick being held down by the piston as before. A hole is left through the palletts, “pistons, or any suitable part of the mould by
“which the superfluous brick earth can escape,” and a fixed

cutter is provided to trim off the same as the bricks are moved away.

3. A machine for making perforated tiles for kilns.

[Printed, 1s. 2d. Drawings. See Repertory of Arts, vol. 5 (*new series*), p. 337; London Journal (*Newton's*), vol. 9 (*conjoined series*), p. 287; also vol. 11 (*conjoined series*), p. 331; Webster's Reports, vol. 1, p. 404; and Webster's Patent Law, p. 17 (also p. 137, case 129).]

A.D. 1835, August 17.—N^o 6831.

SHEPPARD, RICHARD.—Improvements in tiles for covering roofs. The improvements consist in a hollowed rebate formed along one side of each tile, and a corresponding rounded rebate formed on the other edge, so that when the tiles are fixed on a roof the rebated edges of the adjoining tiles may exactly fit into one another and form a secure joint in the thickness of the tile. It is recommended that in the manufacture of these tiles they should be first made plain, then partially dried, and then put into a mould adapted to give the desired section to the edges and subjected to pressure.

[Printed, 9d. Drawings. See Repertory of Arts, vol. 5 (*new series*), p. 88; and London Journal (*Newton's*), vol. 13 (*conjoined series*), p. 100.]

A.D. 1836, December 9.—N^o 7253.

TWEEDDALE, GEORGE, Marquis of.—Forming drain tiles by passing the clay from a feeding hopper between two horizontal cylinders covered with webs of suitable material, on to an endless web which takes it over a shaping cylinder, turned out in the middle to the form of a drain tile: after this the tile is completed by passing between a second shaping cylinder and a pair of inclined rollers, concave on the face, and is carried by two narrow endless bands under a cutting wire (the progress of the endless web being momentarily stopped while the tile is being cut), and thence by a second endless web to the drying shed. A travelling frame containing a "horse" is to be used for the purpose of restoring its shape to any tile which may have become deformed.

Making flats or soles by passing the clay between the horizontal cylinders on to an endless band, by which it is carried to the cutting wires; of these there are a series which are stationary, and one which is moveable, to make transverse cuts.

Flat roofing tiles of equal thickness throughout are made in like

manner, but if required to be thin at the upper or nail end, or to have a flat knob or prominence on the end, the upper horizontal cylinder must be altered to a shape suitable to impress the required form on the clay; a nail hole is made in each tile by a hollow punch attached to a lever and connected with the transverse cutter. An instrument, composed of a series of rollers covered with a web, for placing flat tiles on the shelves, in place of the common peel.

For bricks the machinery used in producing flat tiles can be employed, the distances apart of the rollers, and of the cutters, and the width of the opening in the feeding hopper being regulated to correspond to the dimensions of a brick. If hollows are desired in the upper or under faces of the bricks, corresponding projections must be fixed on the cylinders. Channels along the whole length of these faces may be formed by attaching cords to the surface of the endless webs which cover the cylinders. If the machine be for bricks only its arrangement is varied; the upper horizontal cylinder is placed directly above the other, and the clay-feeding apparatus is altered. Also two vertical cylinders and two metal plates are arranged to regulate the width of the sheet of clay before it enters the space between the horizontal cylinders.

House tiles are formed between a pair of moulds covered with cloth, whereof the upper one moves perpendicularly on slides, and is worked by a lever or crank, the lower one being capable of sliding out of its frame, and of then being turned over sideways to deliver the tile.

The clay is prepared by passing between a pair of large crushing cylinders, and is then milled in the usual way.

[Printed, 1s. 2d. Drawings. See Repertory of Arts, vol. 11 (*new series*), p. 193; and *Mechanics' Magazine*, vol. 31, p. 242.]

A.D. 1837, April 27.—No 7353.

BERRY, MILES.—(*A communication*).—"Certain improvements
" in machinery or apparatus for making or manufacturing bricks,
" tiles, and other such articles."

[No Specification enrolled.]

A.D. 1837, June 17.—No 7391.

ROE, RICHARD.—A combination of mechanical parts into a
machine for consolidating bricks, tiles, &c. under pressure. This

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machine, which is worked by hand, has the mould at the upper portion of a strong frame, closed by a moveable cover capable of being drawn back by a pinion and rack, but which, when over the mould, is held down by a strong cross-head secured to iron rods or levers which move on the main axis of the press. This axis is below the mould and carries cams, the action of which (when rotary motion is given by a winch, pinion, and cog wheel to the axis) forces up a compound plunger into the mould and consolidates its contents. The mould cover being now removed, the continued action of the main axis further raises part of the plunger and expels the brick or tile.

[Printed, 1s. 1d. Drawings. See Repertory of Arts, vol. 9 (*new series*), p. 269; and London Journal (*Newton's*), vol. 17 (*conjoined series*), p. 164.]

A.D. 1837, September 14.—N° 7433.

DAVIES, RICHARD, and WILSON, ROBERT CHRISSOP.—This invention consists in rendering the faces of tiles, slabs, or plates perfectly true and flat, and the edges perfectly square by grinding them after they are in the state called biscuit. The faces of the tiles are ground by their being laid face downwards on a horizontal stone, to which rotary motion is given, weights being laid on them to keep them down, and frames employed to keep them from being carried round by the stone. The face is finished on a metal plate. The edges are ground on the same plate, one being first made true and the others squared from it.

[Printed, 8d. Drawings.]

A.D. 1837, September 21.—N° 7434.

SMART, NEVIL.—Combinations of machinery applicable to preparing the materials for making bricks, “and generally in all those cases where it is desirable to separate the finer and lighter parts of substances from their grosser and heavier ones.” The object is effected by agitating the materials in water by means of tines or forks mounted upon horizontal shafts and turning in tanks or cisterns of any suitable form or material. The lighter portions of the brick or other earth being thus stirred up, are strained through a grating and drawn off in a channel along with the water; this muddy water is then elevated, by means of an endless chain and buckets, or an Archimedean screw, or a lifting wheel, to a high level,

from whence it can be conducted by troughs to tanks or cisterns, in which it is left to solidify, or is mixed with other materials for use.

[Printed, 1s. 10d. Drawings.]

A.D. 1838, January 25.—N° 7551.

PARRY, FRANCIS CHARLES, and DE' LAVELEYE, CHARLES.—(*A communication.*)—"The chief object of this invention is "to supersede the necessity of pug mills and other processes" for preparing brick clay for the moulder, "and to manufacture the "bricks from the clay as dug from the ground, by means of "great pressure effected by the machinery." The moulds, with a moveable piston at the bottom of each, are ranged round the periphery of a large revolving cylinder; a hollow roller is so arranged as to press the earth into them, and the earth is filled into a hopper which feeds it between the cylinder and the roller. The amount of pressure can be regulated. The rotation of the cylinder brings the piston rods past a guide, fixed obliquely, which causes them to eject the bricks on to an endless band. The pistons are subsequently replaced and the moulds sanded.

Two arrangements of machinery are shown on the drawings, one with the mould wheel horizontal, and the other with it vertical.

[Printed, 1s. 1d. Drawings.]

A.D. 1838, August 1.—N° 7757.

TWEEDDALE, GEORGE, Marquis of.—The invention forming the subject of these Letters Patent is the same as N° 7253. By the former Letters Patent the invention was protected in England, Wales, and the town of Berwick-upon-Tweed; and these Letters Patent were granted to extend the protection to the colonies.

[Printed, 1s. 5d. Drawings. See Engineers' and Architects' Journal, vol. 6, p. 202.]

A.D. 1838, August 21.—N° 7777.

STOCKER, SAMUEL.—1. The first part of this invention relates to a mode of constructing chimnies for dwelling houses. The interior of the flue is made of tubes of earthenware, pottery,

clay, &c., constructed with sockets, so that the lower part of each may pass two or three inches over the mouth of the tube below it, and built in with the brickwork.

2. Apparatus for cleansing chimnies.

[Printed, 8d. Drawings. See Repertory of Arts, vol. 11 (*new series*), p. 293; and London Journal (*Newton's*), vol. 15 (*conjoined series*), p. 282.]

A.D. 1839, June 27.—N° 8135.

HODGSON, RICHARD.—Giving to materials for building, paving, and other purposes a form which may be obtained by removing from a solid cube four out of eight equal prisms into which it might be supposed divisible, the remainder “presenting the appearance of two solids or parallelopipeds of equal shape and size, lying obliquely across each other and inclined in opposite directions.” Combining materials thus shaped as a substitute for arches, columns, pavements, &c. In bricks the form may be given by making the two solids singly, to be put together when used, and they may be perforated to admit the passage of air through the floor or other construction built of them.

[Printed, 1s. 1d. Drawings. See Repertory of Arts, vol. 13 (*new series*), p. 200; London Journal (*Newton's*), vol. 16 (*conjoined series*), p. 276; Mechanics' Magazine, vol. 32, p. 261; Inventor's Advocate, vol. 2, p. 20.]

A.D. 1839, November 12.—N° 8267.

WHITE, JAMES.—Machinery for moulding clay and expressing peat.

1. “The application of the inclined surfaces of a screw to press clay through moulding orifices.” The clay previously crushed is fed into a cylinder, wherein the screw works, and is expressed through lateral openings at the lower part of the cylinder, to which openings any mould can be applied.

2. “Stopping the moulded clay while it is being cut.” The cutters are moved forward and brought back by inclined planes carried by the driving shaft, and acting on levers that work them. At the same moment the screw shaft is temporarily disconnected from the driving shaft and the clay is consequently stopped.

3. “Lubricating the clay with water when being moulded by pressure through moulding surfaces.”

4. Employing a similar machine to mix, mould, and compress peat.
5. "Compressing peat by the pressure of the atmosphere, and separating water from it by a pump."

[Printed, 10d. Drawings. See *Mechanics' Magazine*, vol. 35, p. 369; *Inventor's Advocate*, vol. 2, p. 339; *Engineers' and Architects' Journal*, vol. 3, p. 185.]

A.D. 1840, February 22.—N^o 8391.

KERR, THOMAS.—"A new or improved mortar or cement for building; also for mouldings, castings, statuary, tiles, pottery, imitations of soft and hard rocks, and other useful purposes, and which mortar or cement is applicable as a manure for promoting vegetation and destroying noxious insects."

The ingredients are, First, road scrapings, sweepings, ashes, small coal, sea sand, pounded freestone, or any other mineral or vegetable substance in a state of dust or powder, to be sifted through a screen. Secondly, chalk or similar calcareous substance. Thirdly, tar, pitch, oil resin, or some similar substance. Fourthly, bay or common salt. "And I make use," continues the inventor, "of the said four principal classes of ingredients in various portions; and I employ sometimes the whole of them, and at other times two or three of them only, according to the particular purpose to which the mortar or cement made from them is to be applied; all as herein-after more particularly explained."

[Printed, 5d. See *London Journal (Newton's)*, vol. 21 (*conjoined series*), p. 415; *Inventor's Advocate*, vol. 3, p. 131.]

A.D. 1840, August 18.—N^o 8596.

DAVIS, THOMAS JOHN.—"Improvements in the form and combination of blocks of such materials as are now used or hereafter may be used in building or for paving." The forms proposed are described as single, double, or treble rectangular prisms, and elsewhere as "stereo prisms," and are, in fact, oblong rectangular blocks, the double and treble ones being compound blocks, made by connecting two or three single ones at right angles to each other in positions shown in detail by the drawings. These prisms may be bolted together with iron rods.

A memorandum of alteration is appended, having for its object to explain the intentions of the inventor as exhibited in

the drawings originally appended, part of which had been indistinct in their delineation of a variety of "treble prism block."

[Printed, 1s. 5d. Drawings. See London Journal (*Newton's*), vol. 20 (*conjoined series*), p. 249; *Inventor's Advocate*, vol. 4, p. 115; and *Transactions of the Society of Arts*, vol. 54, p. 186.]

A.D. 1840, August 27.—N° 8607.

SMITH, CHARLES.—Various improvements in the manufacture and use of lime.

This invention also includes "the forming of tiles or burned rough surfaces, to be used in substitution of laths to receive cemented surfaces." The material of these tiles is to be one-fourth ground clinkers, or the scoria or slag from smelting furnaces, and three-fourths "good aluminous earthy matter," made, dried, and burned like roofing tiles. They are to be roughened or scored on one side or else perforated; and are to be used in place both of laths and of the first or "pricking-up coat" of plastering, as the second or "laying coat" can be applied at once to them. The inventor does not confine himself to any particular shape, size, or form, two varieties of such tiles are, however, shown on the drawings and described.

[Printed, 1s. 8d. Drawings. See *Mechanics' Magazine*, vol. 37, p. 205; *Inventor's Advocate*, vol. 4, p. 148; and *Engineers' and Architects' Journal*, vol. 4, p. 124.]

A.D. 1841, January 6.—N° 8772.

CHILD, GEORGE.—(*A communication*).—Machinery for making bricks and tiles, &c., shown on the drawing, but the description of which is imperfect. A washing machine for preparing the clay, in which works an Archimedean screw. A brick machine, apparently similar, and from which the clay is expelled through moulding orifices and cut off in suitable lengths. A wheel for pressing bricks, the pressure applied by a screw. A press for artificial stone, and one for bricks. A "wedged mould for artificial stone." An expanding brick mould.

[Printed, 9d. Drawings. See *Mechanics' Magazine*, vol. 35, p. 77; and *Inventor's Advocate*, vol. 5, p. 35.]

A.D. 1841, March 22.—N° 8897.

COOK, ROBERT, and CUNNINGHAM, ANDREW.—"The invention relates to a mode of using a sliding frame or frames (applied to a pug mill), having moulds of the desired shape and size formed therein, into which moulds the brick earth is

“pressed, and subsequently the brick earth thus moulded in the sliding moulds is transferred into other moulds, as will be hereafter explained; and the invention also relates to a mode of using a fixed surface which forms the bottom of the sliding moulds.”

The portable moulds for removing the bricks are laid on to a table at the side of and lower than the fixed surface upon which the sliding moulds rest while being filled. Accordingly, after the brick has been moulded, the action of the machine slides the brick mould off this plate into a position where it exactly covers the portable mould; a discharging piston then descends upon the brick and forces it out of the upper mould, dropping it into the lower one, in which it can be removed by hand.

Two arrangements of machinery for carrying out this invention, differing in various mechanical details and in number of moulds, are shown in the drawings, and described.

[Printed, 1s. 4d. Drawings. See *Mechanics' Magazine*, vol. 35, p. 301; and *Inventor's Advocate*, vol. 5, p. 213.]

A.D. 1841, April 29.—N° 8945.

GIBBS, JOSEPH.—A new combination of materials for making bricks, tiles, pottery, or other useful articles. Machinery for making the same. Also a new process for burning the same, applicable whether the new material be employed or not. The novelty in combination of materials is “the employment of Merstham sand, or pulverized Merstham sandstone, known as firestone,” in combination with the clay or other usual ingredients. Two arrangements of machinery are shown. In the first the material is expelled from a pug mill through a moulding orifice of a section suitable to give the form of the bricks or other articles, and is cut into suitable lengths by a reciprocating cutter. In the second the material is spread out as a sheet on a flat bed, brought to a proper thickness by a roller, divided into strips by a series of parallel cutters following the roller, and then divided into lengths by a transverse cutter. These bricks, after being partially dried, are to be made true and square by being “passed between various arrangements of circular saws or cutters” before being baked. A machine for compressing bricks or tiles is shown; it is mounted on wheels and runs along a railway between the rails of which is a level bed on which the bricks are laid, and it carries a compressing plate, worked by the combined

action of a hydraulic pump and a weight, which is caused to descend on the bricks and consolidates them.

For drying, an arrangement of hacks or drying houses, with railways for communication, is shown. For burning, kilns are built composed of chambers adjoining one another, and capable of being at pleasure disconnected from, or connected with one another and with the discharging chimney; so that a fire being kindled in one chamber, the heat and smoke can be caused to pass through any number of the others before being discharged by the chimney.

[Printed, 1s. 1d. Drawings. See *Mechanics' Magazine*, vol. 35, p. 366; and *Inventor's Advocate*, vol. 5, p. 292.]

A.D. 1841, May 11.—N° 8956.

McNAB, ANDREW.—1. "First, the applying a sliding frame of " moulds under a pug mill, with a bottom, in which are formed " openings to correspond with such moulds, through which openings the moulds are filled by the revolution of the knives or " blades of the pug mill."

2. "The mode of moving a sliding frame of moulds, and " working the pistons or plungers of such moulds by the axis of " the pug mill passing through the sliding frames of moulds." A wheel is keyed on to the central shaft of the pug mill and revolves below the sliding frame; this wheel carries on its upper face a friction roller fixed vertically and an inclined plane. The mould frame has two downward projections corresponding with the friction roller on the wheel, and each of its moulds (of which there are two) has a piston capable of being forced up from below when the rotation of the wheel brings the inclined plane under it. The action of these parts is as follows:—At each semi-revolution the friction roller on the wheel working against one of the projections causes the frame to traverse, removing the full mould from the pug mill and causing the empty one to enter it, after which the further rotation of the wheel brings the inclined plain under the piston of the filled mould, and so causes it to eject the brick, which can be removed by hand.

[Printed, 9d. Drawings. See *Repertory of Arts*, vol. 16 (*new series*), p. 321; *Mechanics' Magazine*, vol. 35, p. 253; and *Inventor's Advocate*, vol. 5, p. 180.]

A.D. 1841, May 22.—N° 8965.

AINSLIE, JOHN.—Machinery for making or moulding tiles, bricks, retorts, tubes, and other articles. The clay descends be-

tween a pair of feeding rollers (each furnished with a doctor or scraper beneath for guiding the same) into a case containing a screw, by the revolution of which screw it is forced into a chamber, and thence through moulds suitably formed to produce the articles required; on emerging therefrom the moulded clay is received by a travelling endless web, which carries it beneath a cutting apparatus for dividing it into proper lengths and arranged so as to make a perpendicular cut during the uninterrupted motion of the apparatus. For making drain tiles, the roof of the chamber is formed on its internal side with connected arches, each arch diverging to its corresponding mould, so that the clay in its progress to the mould receives an embryo shape, and is enabled to discharge itself in straight lines. Moulds for retorts must have cores suspended therein. When making house tiles, each mould must be formed with a sluice or stopper, by raising which a knob or button is left on the tile.

[Printed, 6d. See Repertory of Arts, vol. 4 (*enlarged series*), p. 75; *Mechanics' Magazine*, vol. 35, p. 286; *Inventor's Advocate*, vol. 5, p. 197; and *Engineers' and Architects' Journal*, vol 5, p. 427.]

A.D. 1841, September 30.—N° 9108.

WELCH, EDWARD.—Peculiarly constructed bricks applicable to the building of upright flues, and of flues led or gathered out of the upright. For upright flues two varieties of brick are required, one like a common brick, with a segment of a cube scooped out of its side, and the other like a common brick, with a portion of the surface of its inner side and of its end scooped away in a smaller segment of the same circle. Six of these bricks, namely, two of the first described and four of the others, will form a complete circle, and they will bond with common brickwork. For gathered or raking flues the bricks are to be made with the curved sides bevilled to whatever angle it is desired that the flue shall take.

[Printed, 3d. No drawings.]

A.D. 1841, December 7.—N° 9165.

IRVING, WILLIAM.—A mode of making bricks and tiles by moulding the brick earth, and combining with the mould a series of cutters. The brick earth is thrown into a mould, open at the top, such as will form a block of the shape and dimensions of a series of bricks or tiles laid side by side. A series of cutting wires or other cutters fixed at proper distances apart lie at the bottom of this mould; in the case of tiles, they lie in grooves cut for their

reception ; in the case of bricks, moveable pallets being laid on the bottom of the mould, the cutters lie between them. The mass of brick earth having been moulded and its top levelled, the cutters are passed through it (by hand), and the bricks or tiles being thus formed can be removed to the drying grounds.

[Printed, 1s. 6d. Drawings. See Engineers' and Architects' Journal, vol. 5, pp. 8 and 61.]

A.D. 1842, January 31.—N° 9243.

HUNT, JAMES.—Improvements in machinery for the manufacture of bricks, especially applicable to the machinery described in the Specifications of the Marquis of Tweeddale [Nos. 7253 and 7757] In this modification of that machinery the brick earth is carried perpendicularly downwards between the main cylinders ; the surfaces against which the brick earth is to slide are kept constantly moistened with water ; and as each brick is cut off, after having passed between the cylinders, a pallett board is presented by the action of the machine to receive it. Two cheeks or spandrils limit the width of the sheet of clay as it passes between the rollers, and have channels at the back of them in which water is distributed so as to be caused to percolate through them. Also pipes are provided for conducting water to the surfaces of the large cylinders.

Two parallel endless chains suitably supported are substituted for the web upon which the bricks were removed in the original apparatus, and these carry up the pallett boards to a point where they are raised by a novel apparatus to receive the bricks, and then carry them away with the bricks on them. The mechanical and other details of the machine as it would appear after those modifications have been made are given at great length.

[Printed, 3s. 1d. Drawings.]

A.D. 1842, January 31.—N° 9244.

WILLIAMS, CHARLES WYE.—“ Certain improvements in the “ making and moulding of bricks, artificial fuel, and other “ substances.”

[No Specification enrolled.]

A.D. 1842, June 2.—N° 9376.

REED, JAMES.—This invention relates to improvements in tiles.

1. Roofing tiles to be made with a raised fillet or edge above the *upper edges* and a similar fillet below the lower edges, so as when

fixed to form an overlapping coupling joint, diagonal, oblique, or curved; these tiles are hung anglewise, and their outline is so arranged as always to form a close joint. Valley, eaves, and baring tiles adapted to work in with the above. Similar forms in stone, slate, or other slabs for roofing.

Facing tiles for internal and external faces of walls. These tiles present hexagonal or other polygonal faces, but each one of them is hung up by means of a long triangular prolongation, which recedes back (in two steps) from the finished face, and is covered by the tiles hung above it. This receding portion has fillets at its edges.

The manufacture of these tiles from flat slabs of partly dried clay by subjecting it to great pressure between two moulds of suitable section, the upper die having a strong spring or a weight above it, and the lower one being forced up against it by the action of a crank. Impressing ornamental devices on these tiles. Constructing, in a similar way, facing bricks. Introducing ornamental devices, figures, &c. into the clay of which tiles or facings are made, previous to their being compressed between the moulds.

The use of pulverized brick, tile, or other the like burnt clay or material mixed with lime or other cement for the manufacture, under pressure and without subsequent burning, of tiles, facing and other bricks, slabs, &c.

A method of applying and fixing diagonal slating.

A method of applying india-rubber packing to the joints of tiles, slabs, and slates.

[Printed, 1s. Drawings. See Record of Patent Inventions, vol. 1, p. 359.]

A.D. 1842, November 17.—N^o 9521.

SMITH, CHARLES.—1. Apparatus for receiving plastic material from a pug mill into a large mould, and passing a series of cutters through the mass to form it into laminæ; also “a new form and position of pug or clay mills, with the barrel placed horizontally or at any inclination.”

2. Machinery for “moulding, uniting, compressing, or delivering and laminating plastic or admixture of materials.”

3. Imitating marbles and variegated stone and forming laminæ of the imitation material.

4. Manufacturing bricks and such like articles with impressed or roughened surfaces. Applying laminæ of imitation marble

with the brick earth, and the effect of the burning of bricks. The discovery could be thus utilized has just been especially to the brickmakers of the country when or by whom that discovery was made.

A comprehensive and very complete list of the properties, dimensions, and uses of bricks is given in the articles already repeatedly quoted in the *Architectural Publication Society*, under the heading of Bricks, &c., and references will be found in the list of publications from which further information may be obtained in addition to some of the works already mentioned. In notice, these references include the following: d'Agincourt, *Recueil des fragmens de l'architecture*, 1834; Wedke and Romberg, *die Bausteine*, 1834; Dobson, *Rudimentary Treatise on the Art of Building*, 12mo., London, 1850; Rondélet, *Tr. de l'art de bâtir*, Paris, 1852, and *Supplement*, by Blondel, 1852; Briquetier; Simons, *Account of the Tunnel*, 1840-41, given in *Civil Engineering*, and Clere, *Essai pratique sur l'art de bâtir*, 1828.

or stone to bricks, &c. Manufacturing articles of various kinds, including bricks, tiles, and pottery, entirely out of the "imitation materials, with the apparatus for moulding, rolling, planing, pressing, or printing the same, and for other useful purposes." This apparatus includes a hand press for bricks or blocks, in which they are placed in an expanding and contracting mould, and compressed by a system of levers; and a squaring, planing, and polishing machine, in which the blocks are ranged in a row, and a frame is driven over them carrying two knives and two rollers, so fixed as to cut one face and one end at the same time. Also a hand press.

5. "Manufacture of tiles, flooring, quarries, and rabbetted, mathematical or other tiles, with or without the recessed part being roughed" as a key for the cement used with them. Facing such tiles with laminæ or with any composition. "Rendering cements or compositions and imitations in scagliola impervious to moisture by saturating them in oil or fatty matter, and also forming any kind of plastic materials in various colours, and with various figured or fancy designs" either in the articles themselves or in laminated surfaces applied on them; also the machine, apparatus, moulds, or tools employed in producing such articles.

6. "Impressed surfaces as well as narrow plain tiles in any plastic materials to be used in substitution of laths and pricking-up coats of plastering" and for other purposes, and moulds, apparatus, or tools for the manufacture of the same, including a press, being an improvement on a portion of the invention for which Letters Patent, N° 8607, were granted to the same inventor, August 27, A.D. 1840.

7. A cement for building purposes.

8. Roofing and other tiles rebated to fit each other at the joints, "with or without central sinkage; and coping or other tiles, with weathered or ornamental joints; also the tools or apparatus for making them."

9. Application of tiles or slabs, &c., in layers, to various building purposes, in conjunction with impervious or partly elastic materials between the layers.

10. Adhesive, impervious, or elastic compounds for use along with tiles, &c., as described under head 9.

11. Application of slag, scorix, &c., or glass or other easily

vitrifiable matter, with clay, for forming many articles. Mode of casing the same to protect from injury while burning. Application of fine ground slag, clinkers, &c. for a colouring matter or as a paint.

12. A cement for protecting articles as described under head 11, and for other useful purposes.

13. Draining tiles and tubes, with splayed or bevelled ends to keep them in place. Method of piercing same with holes. Making flanges on the edges or sides of "soles." Moulds or tools used in performing the same.

[Printed, 5s. Drawings. See *Mechanics' Magazine*, vol. 39, p. 42.]

A.D. 1842, December 3.—N° 9534.

SEALY, JOHN.—Dressing and finishing tiles after they have been shelved and are nearly dry, by placing them on a dressing table or horse, the upper surface of which is formed according to the form and shape of the tile to be made, and passing a roller of corresponding section to and fro across the surface of the clay. Also improved forms of tile, in whatever manner manufactured. One form has an arched ledge on one side and an upright ledge on the other, the former being intended to lap over the other as the tiles lie on the roof. The other forms are corrugated with two or more channels running from end to end.

[Printed 5d. Drawings. See *Repertory of Arts*, vol. 1 (*enlarged series*), p. 163; *London Journal (Newton's)*, vol. 23 (*conjoined series*), pp. 203 and 468; and *Mechanics' Magazine*, vol. 38, p. 299.]

A.D. 1842, December 3.—N° 9538.

ETHERIDGE, FREDERICK WILLIAM.—1. "Improvements applied to pug mills or such like machines for expressing or forcing clay or brick earth through orifices," so as to effect the making of two or more tiles at the same time through one orifice, by causing the clay to pass over a mandril or core of shape to correspond with the orifice, and fitted with knives which nearly sever the hollow or tubular tile expressed, dividing it into two or more parts, which can be readily separated when dry.

2. "A mode of applying several orifices, each capable of making one or more tiles, to the bottom of a pug mill or other machine capable of expressing clay or brick earth, combined

“ with suitable apparatus for cutting off the tiles as they are “ forced through the orifices,” each moulding orifice or die having a core or mandril combined with it.

3. A “ mode of applying apparatus for receiving tiles moulded “ through orifices.” The tubular tiles are received on an instrument called a “ porter,” which is similar to a core, and upon which the tile, after it has been cut off, can be removed by hand.

The title of these Letters Patent originally read thus : “ Improvements in the manufacture of bricks, tiles, and other “ similar plastic substances,” but by a Disclaimer and Memorandum of Alteration enrolled June 3, 1843, the title was altered to “ Improvements in the manufacture of tiles.”

[Printed, 2s. Drawings. See Repertory of Arts, vol. 2 (*enlarged series*), p. 65.]

A.D. 1843, January 26.—N° 9610.

KIRBY, JOSEPH.—1. “ My improved apparatus for manufacturing bricks, tiles, and other articles from clay or earthy “ materials consists in a novel construction and arrangement of “ machinery, by means of which clay or earthy materials in an “ unprepared or natural state, being deposited in a hopper, is “ conducted by means of rollers down into a moveable mould, “ which mould being then slid down with the loose clay or earth “ in it under a press, the loose clay or earth is there compressed “ firmly into the mould, and formed into the desired bricks or “ other articles. The further progress of the mould under an “ inclined plane then causes the mould to be lowered, and the “ bricks or other articles to be left standing up free upon pistons, “ from whence they are slid on to a plate ready to be removed by hand, whilst the mould passes back again under the “ hopper to receive a fresh supply of clay or earthy material.”

2. The construction and mode of working of the blocks upon which the moveable moulds work. These traverse along the bed of the machine upon a carriage, being driven by a pinion and rack with reversible motion, the moulds being caused to rise or fall by the action of suitably placed guides. When they come under the press the moulds are free so as to be depressed by the action of the press at the same time as the clay.

[Printed, 9d. Drawings. See London Journal (*Newton's*), vol. 23 (*continued series*), p. 330.]

A.D. 1843, March 8.—N° 9659.

BETTS, WILLIAM, and TAYLOR, WILLIAM.—Machinery for making or producing bricks, tiles, or other similar substances from clay in a harder and drier state than that generally employed. Before introducing the clay into this machine it is necessary to temper it and reduce it to the form of rough bricks or lumps of clay. Such a lump is to be laid on a pallet and placed on a reciprocating frame, which carries it into the machine. A mould with sharp edges now descends and surrounds the clay, cutting off any superfluous pieces, and then a plunger, perforated to allow the escape of any surplus, is caused to descend and compress the brick; before the plunger returns the mould is raised, and then, lest the brick should adhere to the plunger, an additional plunger is caused to retain it in its place till the reciprocating frame, returning with a new lump, dislodges it. The plunger is actuated by an eccentric keyed on to a shaft, to which motion is communicated through two oval toothed wheels gearing into one another. "Toothed wheels of this peculiar form are employed for the purpose of obtaining greater power at the particular moment when the pressure is applied, and also for gaining speed for quickly removing the plunger when it has performed its office."

The water from a cistern is conducted by pipes to two "wipers" covered with cloth, felt, or other suitable substance, and the inside of the mould, each time it rises, comes in contact with them and is thus moistened.

Two or more bricks may be made side by side by increasing the width of the machine, and flat or round tiles, by employing moulds and plungers of corresponding shape.

[Printed, 9d. Drawings. See London Journal (*Newton's*), vol. 24 (*combined series*), p. 3L.]

A.D. 1843, April 25.—N° 9711.

MOON, JAMES.—Formation and employment of bricks suitable to make circular flues to chimnies, such that "every flue is perfect in itself and capable of being taken down without injury or interference to the adjoining flue."

1. Forming the bricks so as to bond in with the general brick-work.

2. "The making of holes through bricks suitably formed for producing circular flues of chimneys."

3. A "mode of constructing chimney bars."
4. "Applying a domical top and valvular ring to tops of "chimneys, as described," for the purpose of preventing down currents.

[Printed, 8d. Drawings. See London Journal (*Newton's*), vol. 24 (*conjoined series*), p. 317; *Mechanics' Magazine*, vol. 33, p. 431.]

A.D. 1843, June 1.—N° 9751.

FORSYTH, THOMAS.—"Improvements in machinery for making "bricks and tiles." 1. The direct application of "steam "pressure for forcing the material into the moulds without "further intermediate apparatus than that described." In this apparatus there is a vertical steam cylinder, with a piston connected by a rod to a piston which works in a clay cylinder fixed below; consequently when steam is thrown into the upper part of the steam cylinder, the clay is forced downwards into moulds, sets of which are caused to pass under the clay cylinder with an intermitting to-and-fro motion. At the intervals of rest a plunger descends upon those sets of moulds which had been filled and moved out of the machine, and forces out the bricks downwards on to loose boards placed to receive them.

2. A curved surface to close the bottom of each mould while being filled, so that the bricks are moulded with enough concavity on their under face to counteract the effect of the friction of the mould and to cause them to come out square.

3. "The combination of wheeled carriages or waggons with a "series of loose boards or other surfaces so constructed as to "admit of their being built upon each other without injury to "the newly made bricks or tiles which rest on them." Also such boards or surfaces to support bricks while drying.

4. "Supplying materials for making bricks or tiles by means "of waggons or boxes with opening bottoms, direct into the "brick or tile making apparatus" by allowing the brick piston to rise out of the clay cylinder, and running these waggons over its top on a tramway constructed for that purpose.

[Printed, 1s. 6d. Drawings. See Repertory of Arts, vol. 3 (*enlarged series*), p. 16.]

A.D. 1843, June 10.—N° 9766.

FRANCIS, ALFRED, and FUNGE, ISAAC.—1. Improvements in the tiles described in Sheppard's Specification of Letters Patent,

N^o 6881, August 17, 1835. The tiles, according to that Patent, had been of a level plane between the grooved edges. "Now according to the present invention it is proposed to produce lighter tiles, reducing the substance of each tile in the centre part thereof by forming the same into a pannel, the outer edges giving sufficient strength to such tiles." Also the edges are to be made more round, and the upper surface may be reeded or plain, or have an impressed device, and the lower end may be reeded or formed to any desired device.

2. Changing the colour of Sheppard's and other ornamental tiles by giving them a second burning, muffled in coal, coke, breeze, or other bituminous or vegetable substances, with or without chalk, to produce a greyish or slate colour. "And if afterwards dipped in a solution of any of the sulphurets with their bases, a further alteration to green or other colours takes place." Employing the same colouring solutions without a second burning. Employing manganese and other metals. Introducing gases into a closed kiln during the first burning.

[Printed, 8d. Drawings. See Repertory of Arts, vol. 3 (*enlarged series*), p. 260; and London Journal (*Newton's*), vol. 23 (*conjoined series*), p. 419.]

A.D. 1843, September 30.—N^o 9886.

AINSLIE, JOHN.—"Drying plastic substances in a close chamber, at an artificial temperature, and under a current of air."

[Printed, 3d. No Drawings. See Repertory of Arts, vol. 3 (*enlarged series*), p. 288; Mechanics' Magazine, vol. 40, p. 255; and Engineers' and Architects' Journal, vol. 7, p. 153.]

A.D. 1844, January 20.—N^o 10,020.

BASFORD, WILLIAM.—1. Moulds of various descriptions, and a press, adapted to the manufacture of bricks, paving tiles, and quarries, having their main portion of ordinary clay, and the face which is to be seen of finer clay. Moulds for segmental bricks or blocks, having the rounded or circular sides open instead of, as is usual, the flat sides open. Clip for holding bricks or tiles while being dressed. Paring and shaving tools.

2. Methods of forming several bricks, tiles, or quarries at the same time, as by a bench or table having a raised rim and constructed with compartments, upon the surface of which a large clot of clay is to be spread and faced with finer clay. Making

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two or more bricks at one time, which may be similarly faced, by an open mould and a cutting frame. Another method with a cutting frame only. "Surface frame" for applying a liquid surface to one or more bricks, &c. Dressing and painting surface of bricks, tiles, &c. with fluid argillaceous or mineral preparations as soon as they are moulded and finished. Machine for pressing these articles, similar to a patent mangle.

3. Roofing tiles, with outer surfaces coated, also with grooved or angular edges and weather-proof joints, made of two patterns to be employed together. "Under drip tiles," to be laid below the joints of surface tiles to receive and carry off any water that may leak through. Hip tiles, which, when laid, present a continuous roll. Rebated ridge tiles.

4. Bricks with sides and ends rebated, or grooved and tongued. Bricks or blocks for flues, rebated at upper and under surfaces. Blocks for cornices, gutters, window heads, coping, &c. Bricks made in the improved moulds, or in any other description of mould, from a clot of clay composed of a coarser body and a cake or layer of finer clay put together into the mould, but with the finer layer presented upward to the web or plane of the mould to be worked and polished.

5. Constructing an oven or kiln for burning or firing bricks, tiles, or other articles, "with hollow floors under the chambers, " and with chambers made impenetrable to the blaze, or perforated so as to admit of the blaze being partially introduced."

[Printed, 1s. 6d.]

A.D. 1844, January 23.—N° 10,022.

WRIGHT, SAMUEL.—Extension of Patent N° 5890, granted to the same inventor 26th January, 1830.

[No Specification enrolled.]

A.D. 1844, March 30.—N° 10,132.

CLAYTON, HENRY.—Relates to the manufacture of tiles, drain pipes or tubes, and bricks.

1. Machine for preparing and clearing the clay from stones, roots or other extraneous and injurious matter.

2. "Apparatus for expressing or forcing clay through orifices

“ or dies, with or without a core, in order to form pipes or tubes, and also tiles of various shapes and dimensions.”

3. “ Mode of lubricating certain parts of tile and brick making machines.”

4. “ Machinery for pressing or moulding clay in moulds in order to form bricks or tiles.” In this machinery the motions of the moveable upper and lower plates of a mould box in which the clay is compressed, and the reciprocating motions of a clay feeder, are all communicated, by means of suitable cams and cranks, from one central shaft, which also drives the endless webs used to convey the clay to and from the mould box.

5. “ Use of a guaging board and cutter for reducing to one uniform length the various pipe or other tiles which are to be burnt within one another.”

6. Employment of quick lime “ to prevent the adhesion of the clay to the utensils, or of the newly made tiles or bricks to each other.”

[Printed, 7½d. Drawings. See *Mechanics' Magazine*, vol. 41, p. 396.]

A.D. 1844, April 18.—N° 10,147.

DENTON, JOHN BAILEY.—This invention relates to machinery for moulding or shaping plastic materials for drainage or other purposes, and “ has for its object a mode of combining the use of two screws, whereby they simultaneously act to press clay or other plastic matter either directly through suitable moulding orifices, or into a chamber or chambers, from which the clay or other plastic matter is forced through suitable orifices by other apparatus.” The screws are placed side by side in a vertical box, and receive rotary motion in opposite directions, and the clay is fed in near the top of the box, and is pugged and mixed, and at the same time forced downwards by their action.

[Printed, 6d. Drawings. See *Repertory of Arts*, vol. 5 (*enlarged series*), p. 95; *London Journal (Newton's)*, vol. 25 (*conjoined series*), p. 393; and *Engineers' and Architects' Journal*, vol. 8, p. 89.]

A.D. 1844, April 18.—N° 10,152.

HODSON, WILLIAM.—1. The part of this invention “ relating exclusively to the making of bricks consists of a mould, the four sides of which fall away, so as to allow of the brick being removed.”

2. "Arrangements for making and compressing bricks, pavers, and tiles by a mould with falling sides and moveable ends," such mould being placed in a frame of iron to be filled with the clay. A double pressing box, with sloping ends, and having strong springs between the upper and lower faces, is next caused to descend on the mould and compresses the clay vertically, and at the same time the sloping ends of the box act upon the moveable ends of the mould, and compress its contents endways. The pressure being completed, the box is first removed, and then the mould is caused to rise out of the frame which held it together, its sides being now free fall down, and the brick is removed.

[Printed, 10d. Drawings. See *Engineers' and Architects' Journal*, vol. 7, p. 409.]

A.D. 1844, May 14.—N^o 10,179.

GRIMSLEY, THOMAS.—1. "A new method of constructing a self-supporting fire-proof roof," by throwing from wall to wall, at short distances apart, arches formed of bricks or blocks made for the purpose, and filling in the space between these arches with peculiarly formed roofing tiles having their edges arranged to fit into and sustain one another, or with metal plates or some other fire-proof covering fitting into grooves formed in the bricks or blocks. The blocks may be moulded or ornamented, and each is furnished with a tenon at one end, and a recess or mortice at the other to receive the tenon of an adjoining block, so that when put together with strong cement they constitute a stiff and rigid rib or arch. Also, tiles for ornamental chimney shafts, and for coping of walls, each tile having a feather edge on two of its sides, and a groove on each of the others. The same system is applicable to the jambs and heads of windows or doors, tracery, and other parts of buildings.

2. A machine for cutting clay, previous to moulding, into cubes, each containing the exact amount required for one tile, or for any other purpose. The clay is trod or rammed into a box with moveable sides and ends, the sides being cut with vertical slits, and wires passing from side to side through these slits having been first laid at the bottom of the box. The clay is now detached from the sides by passing a wire between it and each side; the cross wires are next lifted through it, dividing it into a series of slices standing vertically; and, lastly, the sides and ends being first

removed, a wire is caused to pass through the whole mass, making horizontal cuts at heights so regulated by guides, that each cut shall separate a layer of an equal thickness which, having been already cut vertically, now presents an assemblage of cubes of equal sizes, and can be removed in that form.

[Printed, 1s. 3d. Drawings. See London Journal (*Newton's*), vol. 25 (*continued series*), p. 187; and *Engineers' and Architects' Journal*, vol 7, p. 285.]

A.D. 1844, May 15.—N^o 10,188.

HOLMES, HENRY.—This invention consists in arranging a table for receiving several moulds combined with a suitable “plattin presser,” and also in a peculiar form of mould. The table is free to revolve on its centre, and has channels radiating from its centre, each of which takes one mould. The moulds consist each of a bottom and two ends only, the channel itself forming the two sides; they are held into place by suitable catches, and each one as filled is moved under the presser, which is caused to descend by a screw, and which, when released, rises, by the action of a spiral spring. The moulds, as the bricks in them are compressed, are successively released and removed, and empty moulds substituted.

[Printed, 8d. Drawings. See *Repertory of Arts*, vol. 6 (*enlarged series*), p. 72.]

A.D. 1844, May 23.—N^o 10,200.

WILSON, RICHARD.—Machine for making all kinds of tiles by means of pressure in moulds placed upon the periphery or edge of a many-sided wheel. The wheel is by preference made in the form of a hexagon, and upon each of its six flat sides or edges an under mould is fixed. The clay is prepared and cut into sheets of suitable size, each sheet being laid on a copper plate, upon which it is removed to the under mould, and which is delivered from the mould along with the tile. The wheel revolves on a horizontal axis beneath the upper mould, which descends as each under mould arrives beneath it and compresses the clay.

[Printed, 1s. 1d. Drawings. See *Repertory of Arts*, vol. 5 (*enlarged series*), p. 233.]

A.D. 1844, June 24.—N° 10,237.

WORBY, WILLIAM.—This invention claims “the so arranging
“ machinery that a suitable pug mill or machine shall have sepa-
“ rate cylinders and chambers, each with a piston and moulding
“ orifice, as herein described, combined therewith, by which a
“ succession of bricks, tiles, or other articles may be made,
“ according to the nature of the moulding orifices.” The ar-
rangement of these chambers provides for each remaining open
till it has received its charge of clay, when its piston is caused
to descend and expel the contents, and is then again raised, the
motion being communicated directly from the prime mover of the
pug mill to a ring with which all the pistons are connected.

[Printed, 5*d.* Drawings. See Repertory of Arts, vol. 5 (*enlarged series*),
p. 150; London Journal (*Newton's*), vol. 26 (*conjoined series*), p. 80;
and Engineers' and Architects' Journal, vol. 8, p. 120.]

A.D. 1844, July 30.—N° 10,276.

FORD, WILLIAM.—1. Improvements in machinery for forcing
clay through moulding orifices to form tiles or tubes, by the action
of a piston working in a clay chamber; which improvements
consist in making the chamber so that it may be opened and the
clay introduced in front of the piston, and also in causing the
piston, when it has completed its stroke, to throw the machine
out of gear, and so to stop it.

2. Box or hand mould and mandrill for making sockets to tubes
and drain tiles.

[Printed, 11*d.* Drawings. See Repertory of Arts, vol. 5 (*enlarged series*),
p. 368; Mechanics' Magazine, vol. 42, p. 439; and Engineers' and Archi-
tects' Journal, vol. 8, p. 119.]

A.D. 1844, August 29.—N° 10,299.

SMITH, JAMES, and JOLLY, WILLIAM GAIRDNER.—Relates
to improvements in the form and manufacture of tiles and tubes
for draining.

1. “The manufacture of tiles with indented or jagged ends, so
“ that they will interlock and thereby give support to each other,
“ and be prevented getting out of one continuous line.”

2. “Mode of forming and delivering sheets of suitable material
“ on to the horse or core or other instrument in aid of the work-
“ man when making tiles by hand.” Forming tubes in a segmental
mould; “also the adaptation of an oval horse or core.”

3. “Giving to machinery for making tiles for draining a loco-

“ motive progression by the act of working the machine itself,
 “ so that the workman standing by the machine may conveniently
 “ deliver the tiles as they are made on to suitable surfaces to be
 “ dried.”

4. “ Mode herein described of feeding that description of
 “ machines which work by means of pistons or plungers.”

5. “ Employment of moulding orifices for making tubular tiles
 “ for draining in such manner that the tiles are made one within
 “ another.”

6. “ The depositing of tubes or tiles in a position to be dried
 “ by the action of the machines themselves.”

7. “ The manufacture of tiles for draining by moulding or
 “ shaping peat into the desired form.”

[Printed, 2s. 11d. Drawings. See Repertory of Arts, vol. 6 (*enlarged series*),
 p. 1; and Engineers' and Architects' Journal, vol. 8, p. 263.]

A.D. 1844, September 12.—N° 10,311.

CLARK, CHARES WEARG, and REED, JAMES.—Relates to
 bricks and tiles for circular chimney flues, and is in part a
 modification of the invention of James Moon, described in the
 Specification to Letters Patent, N° 9711, 25th April, 1843.

1. Formation of circular flues by means of bricks of the forms
 shown on the drawings.

2. “ Gathering or angular bricks, so as to keep the opposite
 “ side or face of each brick forming the ‘ wyth ’ between the flues
 “ parallel to each other, whether of circular or other constructed
 “ bricks.”

3. Peculiar shape of bricks as a substitute for “ dead horses ”
 in the kiln.

4. Handling peculiarly formed bricks by means of a false mould,
 the counterpart of the bricks.

5. “ Constructing chambers or ovens in the kiln for the purpose
 “ of burning light or ornamental tiles or bricks, by the peculiar
 “ mode of stacking ” shown on the drawing.

6. Regulating the draughts of a flue by the help of a chimney
 cap containing air channels and openings.

7. Ornamental roofing tiles, made in the form of natural leaves,
 to be employed as a finish to chimney tops and on roofs.

8. “ A ridge tile in two separate parts, which can be used to a
 “ roof of any pitch.”

9. Covering hacks of bricks when drying with Anglesea or other matting, canvas, or any other suitable material stretched on suitable framework.

[Printed, 1s. 11d. Drawings.]

A.D. 1845, January 18.—N° 10,481.

AINSLIE, JOHN.—An improvement on machinery for making tiles and similar articles from clay or other plastic matter, which formed the subject of Letters Patent, N° 8965, granted to the same inventor, May 22, 1841, (and not, as erroneously stated in this Specification, January 1840).

The improvements consist in employing, where extra power is needed, “reefing slides” on the pressing rollers, connected with cams in the interior of the rollers. Also cutting off the brick by the pressure of compressed air between it and a piston in a chamber, into which the machine is caused to expel it.

[Printed, 1s. 6d. Drawings. See Repertory of Arts, vol. 6 (*enlarged series*), p. 231.]

A.D. 1845, January 31.—N° 10,506.

MIDDLETON, THOMAS.—Machinery for the manufacture of artificial fuel, bricks, tiles, and other similar articles, being an improvement upon machinery for the manufacture of artificial fuel, which formed the subject of Letters Patent, N° 10,286, granted to the same inventor. In this machine the moulds are mounted radially on a rotating circular frame, and are filled at a fixed hopper, then carried round to a presser, and subsequently emptied by a piston rising from below. The improvements consist in forming the moulds for the bricks separately of wrought iron, and attaching them together radially by rings of cast iron and keys, applying a hydraulic press to work the compressing plunger through a toggle joint, and employing a scraping apparatus for cleaning the under surface of the plunger.

[Printed, 1s. 3d. Drawings. See London Journal (*Newton's*), vol. 27 (*continued series*), p. 249.]

A.D. 1845, March 27.—N° 10,577.

WELLER, RICHARD.—Machinery for making drain and other tiles and pipes, consisting of two cylinders for receiving the clay,

mounted on trunnions at opposite ends of the framing, and alternately acted upon by two pistons (fixed at opposite ends of a horizontal rack bar) for the purpose of expressing the clay through dies or moulding orifices at the outer ends of such cylinders. Motion is communicated to the rack bar by means of a lever, and catches are applied which act to prevent the piston from being at any time forced back by compressed air. As the piston of either cylinder advances expressing the clay, that which had been in the other is drawn back out of it, and the cylinder is caused to assume a vertical position, to be refilled with clay. In each piston there is an opening covered with a valve, which admits air between the piston and the clay, when the former is drawn back. The tiles, as they are forced out, are received on suitable horses, and cut off by means of wires carried by a sliding frame; and when holes are to be pierced in the tiles, a suitable punch is affixed to the sliding frame.

[Printed, 9d. Drawings. See Repertory of Arts, vol. 7 (*enlarged series*), p. 33; and Engineers' and Architects' Journal, vol. 8, p. 385, and vol. 9, p. 63.]

A.D. 1845, April 24.—N° 10,636.

BEART, ROBERT. — 1. "The making of bricks with holes " through them by means of moulding orifices (having a series of " cores) thro' which clay is pressed."

2. Making holes or recesses into the ends of drain tiles or pipes to receive dowels or pegs of wood or metal to connect the pipes and retain them in the same level with one another.

3. Machine for moulding tiles, consisting of a horizontal trunk or chamber, in which clay is placed, in order that it may be forced out through moulding orifices by a piston. A grating, to intercept any stones which would injure the tiles, is fixed across the trunk, and the face of the piston is made hollow that they may be received into it, and a knife or scraper to keep the surface of the grating free from stones is caused to pass between it and the piston. In order to allow air to pass into the space caused by this scraper, so that the piston may be run back quickly, a plug is provided in the clay trunk. The expressed tiles are received on endless belts, and cut by hand by the help of fixed guides.

[Printed, 1s. 5d. Drawings. See Repertory of Arts, vol. 7 (*enlarged series*), p. 14; and Mechanics' Magazine, vol. 59, p. 46.]

A.D. 1845, October 2.—N° 10,845.

HALL, ALFRED.—Machinery, to be worked by hand and horse-power, for making bricks, tiles, and other articles from plastic materials.

1. General arrangement, by which the clay or other plastic material is conducted from a pug mill into a chamber provided with a pressing plate, which turning on an axis at one edge forms a partial cover to the chamber, and presses the clay through a grating forming the bottom of the same into a set of moulds. The grating contains rectangular openings corresponding in size and number with the compartments in one set of the brick moulds.

2. Knives and plates fixed obliquely in the pug mill for tempering and forcing out the material.

3. Framing for holding the moulds, capable of instant depression, to admit of the removal of a stone or other impediment.

4. Apparatus for placing the moulds under the grating, consisting of a system of levers, which brings up an empty set of moulds to displace those which have been filled.

5. Adjustment of the position of the grating with respect to that of the moulds, so as to check the lateral spreading of the clay and produce perfect bricks, tiles, &c.

[Printed, 1s. Drawings. See London Journal (*Newton's*), vol. 29 (*conjoined series*), p. 153; and Engineers' and Architects' Journal, vol. 9, p. 355.]

A.D. 1845, November 20.—N° 10,968.

SKINNER, GEORGE, and WHALLEY, JOHN.—1. A new composition made of carbonate of lime and silica in certain proportions, together with other suitable ingredients, to form vitreous pastes, called "artificial marble or marble pastes."

2. Combining this new composition with other materials for the manufacture of earthenware and pottery.

3. Compositions for glazing "earthenware or pottery without the use of lead or any other deleterious materials, and without the use of acids, alkalies, or other expensive materials."

4. Application of the composition and glazes to the manufacture of useful articles, including "slabs, tiles, and pavement."

[Printed, 4d. No drawings. See Patent Journal, vol. 1, p. 138.]

A.D. 1845, December 30.—N° 11,023.

RUSSELL, JOHN.—Constructing glass tiles for the purposes of roofing. These tiles are to be flat sheets of glass, with two of the opposite sides of each tile turned up to form flanges. The exact shape of the tiles and their flanges, and the mode of connecting them with one another and with the roof rafters, may be varied. Angular tiles for hips or cupolas.

[Printed, 8d. Drawings. See London Journal (*Newton's*), vol. 29 (*conjoined series*), p. 173; Patent Journal, vol. 1, p. 23; and Engineers' and Architects' Journal, vol. 9, p. 247.]

A.D. 1846, January 15.—N° 11,041.

BENSON, WILLIAM.—Machine for manufacturing tiles, pipes, and other such articles as can be expressed through moulding orifices direct from the sides of a pug mill. This machine resembles an ordinary pug mill the vertical shaft whereof carries curved knives or arms, and is enlarged at the bottom into a conical form. At the lower part of the mill are four dies or moulding orifices, situated at the four opposite sides of the same, and through these orifices the clay is forced by the curved knives (with the assistance of the cone) on to endless webs of flannel or other suitable flexible material, to be then cut into proper lengths by the aid of a "horse." Increasing the thickness of parts of the die and introducing a core to check by increased friction the unequal passing of the clay in making ridge and other tiles of varying thicknesses.

[Printed, 10d. Drawings. See London Journal (*Newton's*), vol. 29 (*conjoined series*), p. 193; and Engineers' and Architects' Journal, vol. 9, p. 356.]

A.D. 1846, March 31.—N° 11,155.

AINSLIE, JOHN.—1. Machinery for the preparation of clay or other material. A large cast-iron pan with a conical bottom, *i.e.*, one sloping down from the centre to the periphery, is supplied with the materials to be ground. Two series of edge rollers, of various thicknesses and with rounded edges, are caused to move round this pan in concentric circular paths, the rollers of one series going over the spaces between the paths of the other series; the material thus thoroughly crushed and prepared escapes through openings at the periphery of the pan.

2. Machinery for moulding bricks by causing the plastic material to pass between four rollers, placed in such a position in a frame that the space between them should be of the size and shape of the intended brick, all the rollers being caused to move at the same time in the same direction and with the same velocity. The clay to be cut to proper lengths, and then removed by a kind of skeleton mould called a lifter. Hollows may be produced by a projection on one of the rollers, or by a cutting wire connected with the lifter and made to move in a circular direction, so as to scoop out an indent.

3. Arranging kilns in sets, so that the two or more may be worked together, the fire being only lighted in one, and the heated air being caused to pass through all the connected kilns before it escapes. Admitting and also conveying away the heat at the bottom of the kiln. Employing the heat which would ordinarily be lost on the opening and cooling of a kiln to circulate through the drying sheds.

[Printed, 2s. 8d. Drawings. See Patent Journal, vol. 1, pp. 337 and 353, and vol. 5, p. 435; and Engineers' and Architects' Journal, vol. 12, p. 188.]

A.D. 1846, June 2.—N^o 11,236.

PERCY, WILLIAM CARTER STAFFORD.—1. Tempering or preparing clay or other plastic material by mixing with water to a thick creamy consistency, agitating in a pug mill or otherwise, and passing the mass through a sieve and allowing it to stand. When the clay has settled the water is to be drawn off and the clay dried for use. The waste heat from clamps or kilns may be employed to dry this clay or the unburned bricks.

2. A form of brick, with grooves or cavities in the sides, to be used for ventilating, conveyance of bell-wires or pipes, prevention of damp, &c.

3. A new form of brick, with serrated bearing surfaces, for situations where strength, mutual support, and solidity are required, as bridges, viaducts, &c.

4. A new form of brick, with rebated joints, for coping to parapets, walls, &c.

5. A form of brick covered with grooves, to act as a key in retaining all kinds of plain or ornamental plaster or cement.

6. "A peculiar formation of tile for draining land."

7. Machine for pressing and lubricating bricks or tiles in a

deep mould between two pistons, the upper affixed to a sliding frame and the lower piston acted on by springs.

8. "A peculiar construction of chimney top for the prevention of downward draught."

[Printed, 10*d.* Drawings. See London Journal (*Newton's*), vol. 33 (*continued series*), p. 264.]

A.D. 1846, June 22.—N^o 11,249.

GARRETT, SPENCER THOMAS.—1. Employment in the manufacture of cements of a "frit" compounded of felspar, barytes, and silica in certain proportions.

2. Improved cements having this "frit" for the base of each.

3. Manufacturing bricks, tiles, quarries, slabs, and artificial stones, "with fillets and grooves on certain of the surfaces thereof, and corresponding in dimensions the one with the other," so that when put together each brick or tile, &c. shall have a projection or groove fitting into a corresponding part of every one of the bricks or tiles adjoining it, either laterally only, or both laterally and vertically.

[Printed, 9*d.* Drawings.]

A.D. 1846, June 30.—N^o 11,276.

HASTINGS, JAMES.—This "invention consists of an improved arrangement of moulding machine, wherein an endless travelling table is made to carry a series of moulds under a vertical hopper, from which they are filled with clay or other plastic matter, and when so filled they are, by the continued action of the table, carried forward to an attendant, who lifts them off from the machine."

The "vertical hopper" is, in fact, a pug mill carrying "pressure plates" and two different descriptions of arms on its central shaft, and having a third set of arms fixed to the interior of the mill itself. The moulds are supported by rollers in an adjustable frame while under the mill, and subsequently pass between a roller and a surface plate. For tiles the supply of clay is diminished and the travelling table brought nearer the mouth of the hopper. Ornamental surfaces can be given to bricks or tiles if preferred.

[Printed, 1*s.* 1*d.* Drawings.]

A.D. 1846, July 6.—N° 11,282.

RANSOME, FREDERICK, and WARREN, JOHN CRABB BLAIR.

—1. "Preparing clay or plastic materials for forming bricks, tiles, pipes, and other similar articles by the admixture or incorporation with the other ingredients of which such articles are usually composed of vegetable, mineral, or bituminous substances, which, being destructible or partially destructible by fire, may, when mixed with other ingredients, and acted upon by fire or other destroying agents, be consumed, burnt away, or decomposed from the clay or indestructible plastic materials, leaving the latter exceedingly porous, and particularly applicable to subsoil draining and all purposes where filtration and porosity is required."

2. The application to brick and tile machines (of the construction where two horizontal clay chambers are employed, furnished with dies at their outer ends, through which clay, fed in at their upper part, is forced out by a pair of connected pistons acting alternately on the one and the other) "of such gearing as will by the continuous rotation of a pinion in one direction cause the piston or plungers to move alternately in opposite directions." One out of several possible varieties of such gearing is shown and described, also a mode of filling the cylinders.

[Printed, 8d. Drawings. See London Journal (*Newton's*), vol. 30 (*conjoined series*), p. 171; and *Engineers' and Architects' Journal*, vol. 10, p. 146.]

A.D. 1846, September 3.—N° 11,365.

FONTAINE MOREAU, PETER ARMAND le Comte de.—(*A communication.*)—1. Improvements relative to "moulding machines

"in which the pug wheel prepares the plastic substances." In the first form of these machines a large horizontal disk, with open, bottomless brick moulds near its circumference, receives continuous rotary motion and carries all its moulds successively under the pug mill and under a scraper, there being a fixed brass plate to cover the lower opening of the moulds during this part of their journey. Further on a piston enters each mould in succession, and thrusts the bricks out downwards, sharing, during the short time that it is in the moulds, the rotary motion of the mould table. This piston is constructed with a telescope joint kept extended by a spring, so that if it misses entering the mould and strikes the table, it shall yield and not be broken. The bricks

drop either on to a circular disk having continuous rotary motion, or on to mould bearer carriages having intermittent motion. The moulds are sanded, sprinkled, and if necessary brushed by the action of the machine.

A modification of the above, in which a train of mould-bearer carriages passes continuously through the pug mill and under a scraper, each carriage having a piston at the bottom of its mould, which by the action of an inclined plane is caused to rise and eject the brick; or the carriages may be fitted with bottomless moulds, a fixed plate being provided under the pug mill, and the bricks being forced down out of each mould as it leaves the machine by a piston; or the moulds with the bricks in them may be removed and emptied by hand.

Two other modifications are shown which differ in the mechanical means employed, but agree in their general disposition, which is that of having two circular horizontal mould plates at opposite sides of the machine, each carrying its moulds through part of the base of the pug mill, under a scraper and to a piston which forces out the bricks downward, to be received upon mould carriages, or an endless chain, or other arrangement. In this modification the motions of the mould plates are intermittent. The modes of conveying motion, as shown and described, to these various parts and to the sand box, are claimed as part of the invention, and more particularly a system of wheels and cams; also the sand box itself is claimed; this has openings which can be closed on the principle of a hit-and-miss grating, and which opening at the proper moment permit the egress of a certain amount of sand, which sand passing through several sieves, falls evenly over the mould.

2. Improvements in machines for moulding bricks and similar plastic articles by means of pressure. In the simplest of these machines the moulds, each with a moveable bottom or piston, and a friction roller, are fixed on carriages and run along a railway under a hopper, where they are filled; the remainder of "this system consists in causing the carriages to pass under a plate which serves to maintain the pressure" above, "and in forcing the piston when ascending an inclined plane to compress the particles of earth;" after running from under the plate the roller on the piston is caused to ascend a further incline, which raises it so as to eject the brick. A modification of the above, in which the motion of the mould carriages is intermittent, the compression being

effected by a piston which descends upon each mould or group of moulds separately, and the pistons of the moulds themselves only serving to eject the brick. A further modification, in which the moulds are fixed near the margins of two horizontal mould plates, to which rotary motion, either continuous or intermittent, can be given. These moulds, like the others, are carried through a hopper, receive pressure, and then have their pistons carried over inclines to eject the bricks.

3. Machine for compressing bricks or other articles when already moulded. In this machine the brick, being placed on a spot indicated by a proper visible guide, is compressed successively between three pairs of plates, whereof the first pair are above and below it, and compress its height, the second pair advance from the sides, and compress it laterally, while the third pair compress it endways. These movements and the subsequent retraction of the plates can either be effected by the action of screws affixed to the pressure plates or by eccentric or other lifts or cams on a circular disc, acting upon rollers connected with the pressure plates.

[Printed, 6s. 4d. Drawings.]

A.D. 1846, September 17.—N^o 11,374.

FRANKLIN, HENRY.—Machinery to facilitate the operations of pugging, screening, and moulding in making bricks. The main portion of this machine is a pug mill, consisting of an upright iron cylinder, with an intermediate rectangular chamber dividing it into an upper and lower portion, and having a second rectangular chamber below it. In this cylinder works a screw, the blades of which are of such a form that the upper side of them is at right angles to the central shaft, while the under side slopes upwards so as to force the material outwards. The blades of the screw are interrupted at the upper box, and a moveable screen or grating is there introduced, and above it a "curved wiper" is fixed to the shaft; this screen stops all stones, &c., and the wiper sweeps them into the corners of the box, which can be opened for their removal and for the removal and cleansing of the screens. The lowest box is provided with moulding orifices, rollers to receive the moulded clay, and cutters. The peculiar screw and the arrangements for pugging and screening are claimed even if used separately.

[Printed, 9d. Drawings. See London Journal (*Newton's*), vol. 30 (*continued series*), p. 249; *Mechanics' Magazine*, vol. 46, p. 459; and *Patent Journal*, vol. 2, p. 732.]

A.D. 1846, October 8.—N° 11,408.

FARNSWORTH, JAMES.—1. Machinery for preparing materials of which bricks and tiles are to be composed, and consisting “of rotatory cutters set upon pairs of shafts, which revolve at different velocities, the flat faces of the cutting teeth on the one shaft facing and revolving nearly in contact with the flat faces of the cutting teeth on the other shaft.”

2. Apparatus for moulding bricks and tiles, including especially a “mould table, revolving horizontally with intermittent movement,” the clay being fed into its moulds out of a hopper, together with “cams revolving vertically and compressing the clay in the moulds between the plungers forming the bottom of the moulds and the plungers in the frame of the apparatus,” or between the former and a fixed upper plate; also a circular railway with inclines, along which friction rollers attached to the bottom plungers of the moulds travel, and which by raising them and allowing them to fall at proper times eject the moulded bricks, and prepare the mould for a fresh charge.

[Printed, 10*d.* Drawings. See Patent Journal, vol. 2, p. 891.]

A.D. 1846, November 5.—N° 11,440.

TEAGLE, ROBERT.—1. Improvements in chimney pots, some to be fixed just over the fire-place within the chimney, and others to be fixed at the top of the chimney. Those fixed near the fire have a lower part with convergent sides, above which they divide into two or more divergent branches, which reunite to form one compartment corresponding in size with the chimney above. Those fixed at the top of the flue have in their lower portion an enlargement, above which is a narrow part pierced for “several vanes, forming channels, up which the outer air passes into the interior of the head of the pot;” this head is conical, and it is preferred to have a cover or hood at the top of it.

2. “Brush apparatus for cleansing chimnies.”

[Printed, 11*d.* Drawings. See Patent Journal, vol. 2, p. 859.]

A.D. 1847, February 8.—N° 11,562.

GRUNDY, GEORGE.—Improvements in furnaces for generating gas, but applicable to other furnaces, and consisting in a continuous fire-place from end to end of the furnace, supplied with air from air tubes running parallel to it through a series of openings; also in

the conduction of the heat repeatedly from end to end or from end to centre. Also the construction and employment of cylindrical cylinders or tubes of fire-clay or tile for generating gas, sometimes with metallic hoops imbedded in them to give extra strength. These tubes are in lengths, and the joints are made good with fire-clay, and supported by fire-clay tiles of peculiar form.

[Printed 9d. Drawings. See Repertory of Arts, vol. 10 (*enlarged series*), p. 158; London Journal (*Newton's*), vol. 31 (*conjoined series*), p. 116; Patent Journal, vol. 3, p. 294; Engineers' and Architects' Journal, vol. 10, p. 319; and Artizan, vol. 5, p. 227.]

A.D. 1847, April 29.—N° 11,682.

PERCY, WILLIAM CARTER STAFFORD.—1. A spade for cutting clay, furnished with projecting sides, and having the lower edge of the blade made thicker than the blade itself.

2. Mechanism for shaping bricks or tiles from a clod of clay. The clod is placed upon a table directly under a piston, which by the action of the machine is made to compress the clay to the requisite thickness; a box surrounding this piston is next forced down, the edges of which cut off the superabundant clay; and lastly both piston and box are caused to rise, and leave the brick on the table.

3. "Machines for making and dressing bricks, in which a labri-cating piston works in a box or mould, into which the brick or other article is pressed."

4. Compressing bricks or tiles by means of the direct action of steam by connecting the piston rod of a steam engine with the top piston of a machine for making and dressing bricks.

5. Constructing the floors of sheds in which bricks are to be dried of tiles of such a form, that when two are placed one over the other they form a hollow box square externally and open at all the four sides. These boxes, when placed side by side, will form a floor having flues for hot air in all directions under its whole surface.

[Printed, 1s. 1d. Drawings. See Repertory of Arts, vol. 11 (*enlarged series*) p. 19; and Patent Journal, vol. 3, p. 574.]

A.D. 1847, June 10.—N° 11,739.

COX, HENRY.—Preserving or preparing wood, bricks, tiles, and other substances by drying them, and impregnating them with the residuum after the distillation of gas tar, asphalte, pitch, or

any other bituminous substance which will melt at a high temperature, either alone or mixed with stearine, or with other substances. In operating upon bricks or tiles they must be immersed in the substance in a heated state. Bricks or tiles of inferior quality, or unburned articles or pieces of dried peat or turf, may be thus indurated. Also a bituminous cement, to be employed in place of mortar in laying the bricks thus prepared.

[Printed, 4d. No drawings. See *Mechanics' Magazine*, vol. 47, p. 600.]

A.D. 1847, October 22.—N° 11,922.

KIRRRAGE, WILLIAM.—The use of sal-ammoniac in the manufacture of asphalte, and also in concrete. The making of building blocks of this said asphalte mixed with brick or other rubbish. The application of this or any other asphalte to the coating or facing of blocks, or stones, or concrete.

[Printed, 3d. Drawings. See *London Journal (Newton's)*, vol. 31 (*continued series*), p. 432.]

A.D. 1847, November 18.—N° 11,972.

MARTIN, THOMAS.—A "mode of combining mechanical parts" for giving motion to the plungers in a machine for moulding drain tiles, tubes, and other articles by expressing clay through moulding orifices; to be worked by hand. In this machine two clay boxes, fixed side by side, are alternately supplied with clay, to be expelled through the dies by the action of two plungers; the clay so moulded is received on a series of rollers in front of the machine and cut to lengths. The motion is communicated to the pistons from a shaft moved by the action of a lever and claw acting on a ratchet wheel; this shaft carries cog wheels, and is moveable on its bearings so that the cog wheels come into gear alternately with one or other of two racks attached to the two pistons. Also constructing dies for making pipes with sockets, so that when a sufficient length of pipe has been made the moulding orifice can be enlarged, to correspond with part of the core, so that a socket can be made to any desired length.

[Printed, 1s. 9d. Drawings. See *Repertory of Arts*, vol. 12 (*enlarged series*), p. 35; and *Patent Journal*, vol. 5, p. 85.]

A.D. 1848, March 22.—N° 12,103.

ORSI, JOSEPH.—1. The manufacture of an artificial stone from gravel or stone broken small, chalk, tar, and wax, to which the name of "brown lava" is given.

2. Making pipes of the same by rolling a suitably coated mandril over a table covered with the lava in a molten state.

3. Employing in the manufacture of ornamental tiles, bricks, and quarries a substance called "ornamental lava," to be composed of ground flint, marble broken small, resin, and wax, with the addition of various colouring matters.

4. Forming ornamental tiles in this material by moulding the portions that are to be of one colour separately and fixing them in a mould, into which the lava of another colour is cast round them, and finally strengthening the tile with a backing of "brown lava."

5. Manufacturing cements from the same ingredients as the "lava."

[Printed, 3d. No drawings. See London Journal (*Newton's*), vol. 33 (*conjoined series*), p. 303; *Mechanics' Magazine*, vol. 40, p. 308; and *Artizan*, vol. 7, p. 34.]

A.D. 1848, June 30.—N° 12,197.

SKERTCHLEY, JOSEPH.—"So to construct and fashion the "bricks used for building purposes, that when the same are "required to be covered on either or both of their faces with "plaster, cement, stucco, or other like coating, such coating shall "be so dovetailed into the adjacent bricks as to be afterwards "detachable therefrom only with great difficulty (if at all)." Accordingly an under-cut groove, broader at the base than at the top, is formed in each brick on the face or faces which are to be plastered.

2. Improvements in the manufacture of tobacco pipes.

[Printed, 1s. 3d. Drawings. See *Mechanics' Magazine*, vol. 50, p. 20; *Artizan*, vol. 7, p. 131; *Patent Journal*, vol. 6, p. 136; and *Engineers' and Architects' Journal*, vol. 12, p. 55.]

A.D. 1848, July 18.—N° 12,213.

SWAIN, WILLIAM.—"Improvements in the construction of "kilns for burning bricks, tiles, or other earthen substances," consisting in the use of doors to all the openings that give access to the furnaces or fire-places of the kiln, "in order to regulate "or stop out altogether the passage of air into the fires and "kilns," with a view to economise the consumption of fuel.

[Printed, 9d. Drawings. See London Journal (*Newton's*), vol. 34 (*conjoined series*), p. 30; *Mechanics' Magazine*, vol. 50, p. 90; *Artizan*, vol. 7, p. 133; *Patent Journal*, vol. 6, p. 154; and *Engineers' and Architects' Journal*, vol. 12, p. 81.]

A.D. 1848, November 2.—N° 12,311.

HART, JAMES.—1. Apparatus for washing and cleansing clay and other earths, consisting of a trough, by preference made of metal or wood, and fixed high enough to admit of trucks being moved under it into which the accumulations of stones and rubbish can be dropped through doors left for the purpose. A long shaft, working in friction roller bearings at the ends of the trough, carries the washers, which are blades of steel or other yielding material. The whole being capable of being readily taken down, removed, and refixed.

2. “Applying compressing rollers (placed eccentrically of their axes) for the purpose of compressing clay and other earths and “plastic materials.”

3. Machinery for making bricks and tiles, and moulding other articles. The brick earth is thrown into a hopper, from which it is forced down into the moulds by the action of arms fixed on rotating axes. The moulds are formed of an endless chain of plates linked together, each bearing a friction roller running on guides, which direct it through the hopper. Each plate forms the bottom of one mould, and upon it are placed removable parts hinged together, forming one side and two ends of one mould, which is completed by the side of the adjoining mould. After being filled, these moulds travel under a compressing roller and diagonal scrapers, and the moveable parts are then removed with the brick, and returned upon an endless band. Arrangements for brushing or moistening and sanding the moulds. Arrangements for rendering the machine portable.

[Printed, 2s. 5d. Drawings. See *Mechanics' Magazine*, vol. 50, p. 430; and *Patent Journal*, vol. 7, p. 48.]

A.D. 1849, February 6.—N° 12,454.

SNOWDON, THOMAS.—“A machine for moulding and pressing artificial fuel and bricks.” In this machine there are two upright moulds, fixed side by side, with compressing pistons rising from below and having sliding covers.

The material for filling each mould is placed in an open compartment of its own sliding cover, out of which, when the cover is moved, the material falls into the mould; the cover is after this moved further and closes the mould, and the piston is caused to compress the contents. The cover is now

drawn entirely back, upon which a further lift of the piston raises the brick to the level of the top of the mould, from which place it is removed by the front of the sliding cover returning with a new load of material, which, after the piston has been drawn down to make room for it, will be dropped down as before. Both moulds are in action at once, one delivering its contents as the other receives and compresses its charge.

All the motions are derived from one wheel keyed on to a main driving shaft, which has cams, projections, and studs acting on levers and systems of levers combined so as properly to actuate all the parts of the moulding machinery. "In place of having the brick earth in a plastic state, it will require to have only so much moisture as to be in a granular state."

[Printed, 1s. 6d. Drawings. See *Mechanics' Magazine*, vol. 51, p. 142; and *Patent Journal*, vol. 7, p. 191.]

A.D. 1849, February 8.—N^o 12,464.

TAYLOR, JOHN.—This invention relates to a mode of constructing such walls as have a facing of a finer description of material than the interior masonry or brickwork. The facing is to be of stone, artificial stone, tile, brick, or other material in flat blocks or slabs, each block having at its upper end a flange or rib projecting from its back; this flange is to be built into the masonry or brickwork, and to bond with it, a channel being formed by setting back one course of the work. The height of the facing blocks must be so proportioned to that of the courses of the other work that the facing blocks shall not bear upon and be supported by one another, but each one of them shall hang by its own flange or rib.

By a disclaimer dated April 9, A.D. 1849, the words "and fencing," which had formed part of the title of this invention, are struck out.

[Printed, 6d. Drawings. See *London Journal (Newton's)*, vol. 35 (*continued series*), p. 97; *Mechanics' Magazine*, vol. 51, p. 140; *Patent Journal*, vol. 7, p. 217; and *Engineers' and Architects' Journal*, vol. 12, p. 301.]

A.D. 1849, May 3.—N^o 12,601.

WHALEY, THOMAS, and LIGHTOLLER, RICHARD.—Improvements in apparatus for manufacturing all kinds of bricks, tiles, quarries, pipes, and similar articles from plastic materials by *expression through a moulding orifice*.

1. *Combining a pug mill and pressing cylinder, or a pug mill,*

pressing cylinder, screens, and die plate in one machine. The clay passes from the pug mill into a horizontal pressing cylinder through an opening in the upper side of the latter; a piston alternately advances towards and recedes from the delivery end of this cylinder, at each advance causing a slide to close the opening where the clay had entered, and forcing the clay through cleansing screens into a mouthpiece, and thence through the moulding orifices.

2. A double sliding screen, one-half only being in use at once, so that the portion used can be moved out to be cleansed, and the other half can be caused to take its place without removing the screen from the machine. Also a second fixed screen, with its bars at right angles to those of the first one.

3. A chain of small carriages for receiving the moulded material, which may then be severed between the carriages by wires.

[Printed, 1s. 1d. Drawings. See London Journal (*Newton's*), vol. 37 (*conjoined series*), p. 163; *Mechanics' Magazine*, vol. 51, p. 440; and Patent Journal, vol. 8, p. 82.]

A.D. 1849, June 7.—N° 12,645.

BURTON, BENNETT ALFRED.—“Improvements in the manufacture of pipes, tiles, bricks, copings, and other like or similar articles composed of plastic materials.”

1. Compressing and consolidating such articles between rollers of suitable form after they have been moulded.

The newly moulded article is made to pass through a set of rollers having their faces turned to such a shape that when placed together they form an opening similar to, but slightly smaller than that of the die. The compressing apparatus may be a separate machine, but in the case of earthenware pipes may be combined with the machine for making them; this consists of two upright cylinders for receiving the clay, cast together upon a sole plate, which turns on a stud, and by this means brings each cylinder in turn beneath a piston, whereby the clay is forced through a die at the bottom of the cylinder and on to a long mandril extending to the compressing rollers. The number of compressing rollers and shape of their peripheries will vary according to the form of the article to be compressed.

2. “Making bends for pipes, or bend pipes, by placing the centre part of the die eccentrically with the hole in the die

"plate." Also "compressing in a separate machine the particles of matter of which the bends are composed."

3. "Machines for forming rabet or socket and screw joints to the ends of pipes, together with the mode of cutting rabet joints upon the ends of hollow bricks or tiles by revolving cutters."

[Printed, 1s. 9d. Drawings. See *Mechanics' Magazine*, vol. 51, p. 573; *Practical Mechanics' Journal*, vol. 2, p. 250; and *Patent Journal*, vol. 8, p. 153.]

A.D. 1849, July 7.—N° 12,698.

GARRETT, RICHARD.—"Improvements in horse-hoes, pug mills, drilling and thrashing machinery, and in steam engines and boilers for agricultural purposes." The pug mill constructed according to this invention is a cast-iron cylinder having a central shaft working in it with arms bearing knives. These pug the clay and force it into a short cylindrical "straining cylinder" bolted to the bottom of the pug mill. The prepared clay passes out through gratings in the sides of this chamber, but the stones and other impediments are retained, and by the continued action of "a wiper arm" are forced into boxes opening out of the bottom of the chamber, where they accumulate, and from whence they can be removed as often as necessary.

[Printed, 3s. 4d. Drawings. See *Mechanics' Magazine*, vol. 52, p. 39; and *Patent Journal*, vol. 8, p. 191.]

A.D. 1849, November 2.—N° 12,831.

MORRIS, WILLIAM.—Machine for the manufacture of bricks, tiles, &c., in moulds.

In this machine two groups of moulds are worked at once, each group containing any convenient number; these occupy two iron frames hung on centres and carried by a larger frame running on rollers and capable of being worked to and fro through the machine. In the centre of the machine is a hand press with a pressing block, to the under surface of which are attached dies corresponding to the moulds of one group. The moulds of each group in succession are filled by hand with lumps of clay, are moved under the press and pressed, and then moved back, the surplus clay being removed by a cutter. The frame containing the group of moulds is now turned over on its bearings, and the bottoms of the moulds (which are moveable) being forced forward, the bricks fall on to a carriage with springs placed to receive them; their weight depresses the upper part of the car-

riage sufficiently to permit its convenient removal, after which the bottoms of the moulds are replaced, and the frame turned back again.

The false bottoms of the moulds have springs attached to them forming the ends of the moulds, and these, by flying apart, aid in detaching the brick when it is about to be delivered.

A modification is shown in which the moulds are on the periphery of a circular wheel, and have their contents compressed one at a time, while the carriages which receive the bricks are curved and run on a circular tramway. Tiles may be made by varying the size and shape of the moulds employed.

By a Disclaimer, enrolled 2nd May 1850, a portion of the title under which this invention was described, namely, the words "the preparation of clay," is omitted.

[Printed, 1s. 8d. Drawings. See Repertory of Arts, vol. 15 (*enlarged series*), p. 353; *Mechanics' Magazine*, vol. 52, p. 376; and *Patent Journal*, vol. 9, p. 55.]

A.D. 1849, December 10.—N^o 12,884.

GRIMSLEY, THOMAS.—1. A machine capable of making bricks of a peculiar form, delineated on the drawings. These bricks are curved on one bed and one side, grooved and tongued at the ends, and perforated. In this machine the clay is forced out of a clay channel by a piston through a moulding orifice with cores, and is received on "a travelling bed composed of a number of plates or boards, which are pushed in beneath the cylinder one after the other, according as they are required." The mass of moulded clay is cut into lengths by a frame carrying a number of cutting wires moving against guides of a peculiar shape, adapted to cause the cuts to be in a waving and not a straight line, and thus to produce the rebated ends.

Apparatus for cutting grooves and tongues of a circular curve. Cutting apparatus where a single cutter cuts off the required length as soon as it has passed the die.

Employment of two endless screws working in a chamber to express clay through a die or moulding orifice. Apparatus for effecting the same end, or (if the die be removed) for crushing the clay, consisting of two rollers with a corrugated surface revolving in opposite directions within a hopper and clay chamber.

Various forms of bricks for paving and building, and for skew

backs, including bricks with perforations, such as to enable them to be secured together, when laid, by means of iron bars. Bricks applicable to the paving, which formed the subject of Letters Patent, N° 10,179, granted to the same inventor, 14 May 1844.

2. "Employment in the construction of drains and sewers and other conduits of liquids and liquid matters of bricks, glazed on those parts of their surfaces over which the said liquids or liquid matters are designed to flow."

3. An improved drying kiln, consisting of a "combination of four separate chambers or compartments (capable of being used collectively or individually), with the drying room or rooms over the same."

[Printed, 2s. 7d. Drawings. See *Mechanics' Magazine*, vol. 52, p. 477; and vol. 53, p. 1; and *Patent Journal*, vol. 9, p. 129.]

A.D. 1849, December 15.—N° 12,896.

ROBERTS, HENRY.—Improved bricks of such a form as to secure a bond without vertical joints passing through the wall, and without headers. These bricks are by preference made hollow, and are made with one or both of their sides either oblique or rebated, as can be more distinctly understood by consulting the drawing accompanying the Specification; and it is proposed to lay them all as stretchers, *i.e.*, with their greatest length lying along and not across the wall, in which position the bond is preserved by "an overlapping of the alternate or of the parallel courses of bricks."

[Printed, 8d. Drawings. See *Repertory of Arts*, vol. 16 (*enlarged series*), p. 83; *London Journal (Newton's)*, vol. 36 (*conjoined series*), p. 389; *Mechanics' Magazine*, vol. 52, p. 496; *Artizan*, vol. 10, p. 160; and *Patent Journal*, vol. 9, p. 154.]

A.D. 1850, January 3.—N° 12,914.

DORNING, HENRY.—1. "A machine for manufacturing bricks and tiles to be applied to the ordinary pug mill, having a revolving table with recesses or moulds formed therein, which pass in succession beneath the lower opening of the pug mill."

2. "The application and use of a worm and worm wheel, in combination with cranks and connecting rods, for impelling the pistons in those machines now in use wherein the bricks or tiles *are formed by pressing the clay through d'es.*"

3. "Mechanism for consolidating bricks or tiles." One form of this mechanism "consists of a piston acting upwards inside a "mould, and impelled in the same manner as the pistons in the "previously described machine, namely by a worm, worm wheel, "crank, and connecting rod actuated by manual power."

In another form there are two moulds capable of sliding horizontally and a presser for each. The brick placed in one of these is drawn in under the presser, pressed, and then slid out of the machine and displaced; all the motions being gone through alternately by one and the other mould, and being derived from cams placed on one central shaft, acting on suitably arranged systems of levers. A modification of the last, in which "the moulds are "fixed upon a table, which is caused to vibrate so as to bring each "mould alternately under the pressers."

[Printed, 1s. 2d. Drawings. See *Mechanics' Magazine*, vol. 53, p. 18; and *Patent Journal*, vol. 9, p. 161.]

A.D. 1850, March 23.—N^o 13,022.

WELCH, EDWARD.—The portion of this invention relating to bricks consists in forming bricks of such a shape, that when put together, six of them to one course, they will form a flue, the outline of which would be nearly circular, being in fact described from four centres. For the sloping part of the flue the bricks are to be cast to any angle required. Improved wind-guard. Improvements in grates, ranges, &c.

[Printed, 5d. Drawings. See *Mechanics' Magazine*, vol. 53, p. 257; also vol. 54, p. 93; and *Patent Journal*, vol. 9, p. 296.]

A.D. 1850, April 27.—N^o 13,064.

ELLIOTT, WILLIAM GILBERT.—Manufacturing bricks, tiles, pipes, or any articles capable of being manufactured of clay or other plastic material, by running such clay or other plastic material in a molten or fused state into suitable moulds, which should be brought into direct contact with the furnace.

[Printed, 3d. No drawings. See *London Journal (Newton's)*, vol. 36 (*continued series*), p. 317; *Mechanics' Magazine*, vol. 53, p. 299; also vol. 57, p. 448; *Artizan*, vol. 9, p. 114; and *Patent Journal*, vol. 9, p. 114.

A.D. 1850, June 11.—N° 13,118.

PARKES, ALEXANDER.—1. An improved furnace for calcining metallic ores.

2. A method of separating silver from lead.

3. Improved compounds for fire-bricks and other forms intended to be exposed to high temperatures. "Any natural quartzous substance" may be selected, those containing the largest proportion of silex being preferred, and having been crushed to small lumps, must be combined in a wet state with either slaked lime or ground sulphate of lime or of baryta, to form the material of the bricks, &c.

4. Apparatus in furnaces for applying jets of steam to facilitate the combustion of anthracite or stone coal.

[Printed, 10d. Drawings. See Repertory of Arts, vol. 17 (*enlarged series*), p. 70; London Journal (*Newton's*), vol. 40 (*conjoined series*), p. 436; Mechanics' Magazine, vol. 53, p. 406; and Patent Journal, vol. 10, p. 123.]

A.D. 1850, October 10.—N° 13,275.

BEART, ROBERT.—1. "Apparatus employed when manufacturing perforated bricks." This part of the invention is an improvement upon the machinery forming part of the invention for which Letters Patent, N° 10,636, were granted to the same inventor, bearing date 24 April 1845. In place of allowing the bars which carry the cores to produce perforations in bricks to be all at the same distance behind the orifice of the mould, the stems of the cores are made of unequal lengths, allowing the bars that carry them to be at different distances from the moulding orifice.

2. "Improvements in drying bricks and tiles," by the use of a stove or oven so constructed "that the heat from a fire or fires passes into a chamber, from which it descends and passes out at intervals into and through a series of reticulated (perforated with numerous holes) flues or arches, and from which the products pass into drying chambers, and thence with the vapours from the drying bricks or tiles to a chimney or chimnies." The floors of the ovens or drying chambers have an uniform incline from end to end, and within them are a series of bearers in parallel rows carrying small flanged rollers; frames to carry the bricks are employed, which are introduced at the highest side of the oven, and rest upon and between the flanges of two rows of these rollers,

so that they can be caused to travel across the chamber to the lower side and there removed. Barrows of a proper height, to be level with these sets of rollers, are used to bring the frames to and take them from the ovens.

[Printed, 2s. 9d. Drawings. See *Mechanics' Magazine*, vol. 54, p. 319; and vol. 59, p. 46; and *Patent Journal*, vol. 11, p. 37.]

A.D. 1850, October 17.—N° 13,288.

BADDELEY, JAMES HENRY.—A method of manufacturing from plastic materials cornices, ornamental bricks, and other articles decorated with ornamental designs in relief. Clay or cream marl is to be first soaked in water, and then mixed with a proportion of some vitrifiable substance, and with common salt or soda, strained, evaporated to a stiff paste, and kneaded. The materials so prepared are then subjected to great pressure in a screw press, from which they are forced out through a moulding orifice, which brings them to a shape near to the intended finished shape, after which they are cut into lengths. The plastic mass so far prepared is finished in a fly press, where it is compressed in a mould containing the pattern which it is proposed to impress upon the brick or other article.

[Printed, 10d. Drawings. See *London Journal (Newton's)*, vol. 39 (*continued series*), p. 143; *Mechanics' Magazine*, vol. 54, p. 338; and *Patent Journal*, vol. 11, p. 36.]

A.D. 1850, November 2.—N° 13,312.

SLATE, JOHN.—1. "The construction of register stoves, or "grates and ranges with double cheeks, one fixed and the other "moveable, with the register plate inclined upwards from the "front to the back of the chimney, and with a shifting smoke "director placed in the throat of the chimney."

2. Chimney pots of an improved construction, one form showing a spiral cowl, surmounting a cylindrical or other shaped stalk; another form being similar, but having apertures in the stalk; and a third having as hood a frustum of a cone carrying several short tubes each with its own hood. A chimney pot with apertures in the stalk and spiral ledges to direct the air entering through them into an upward course, being an improvement upon a chimney pot registered by the same inventor, 6 October 1847.

[Printed, 6d. Drawings. See *Mechanics' Magazine*, vol. 54, p. 378; and *Patent Journal*, vol. 11, p. 62.]

A.D. 1850, November 30.—N° 13,369.

BORIE, HENRY JULES.—"Constructing and arranging moulds through which clay is forced for making hollow bricks, so that the bar or bars which carry the cores which form the holes in the brick is placed opposite to the partitions or solid part of the brick."

[Printed, 9d. Drawings. See Repertory of Arts, vol. 18 (*enlarged series*), p. 80; *Mechanics' Magazine*, vol. 54, p. 457; and *Patent Journal*, vol. 11, p. 108.]

A.D. 1850, November 30.—N° 13,376.

AINSLIE, JOHN.—Employing two or more series of circular plates or discs, fixed on spindles or shafts, with the discs of one series entering the spaces between the discs of the next series, and revolving in the opposite direction, for crushing and grinding earths, clays, or other materials used in the manufacture of bricks, tiles, pottery ware, and china, or any article made of plastic material, and also for grinding mineral, animal, or vegetable matters.

2. Arrangements of kilns for drying such articles or matters as are above described, in which the articles dried are wholly or partially surrounded by a continuous flue or continuous flues, formed spirally so as to wind round and round the chamber as they rise from the furnace or furnaces to the chimney.

3. Employing arrangements of circular plates or discs similar to those described under head 1 for the purpose of forcing clay or other plastic matter into or through a mould or moulds.

[Printed, 7d. See *Mechanics' Magazine*, vol. 54, p. 458; and *Patent Journal*, vol. 11, p. 133.]

A.D. 1851, March 17.—N° 13,559.

HART, JAMES.—1. Improvements in the arrangement of certain machinery for making bricks and tiles, for which Letters Patent, No. 12,311, were granted to the same inventor, 2 November 1848. Making the brick moulds internally wider at the bottom than the top, and with flanges to aid the workman in the removal of them; means of preventing the endless chain of plates from slipping; *guides for the mould chain* and elastic bearings for the support of

the same, "all which will be readily understood on examining the "drawings."

Improvements in giving motion to the endless chain of plates and in starting and stopping the machine; application to the machine and arrangement of revolving scrapers; stuffing boxes to shafts passing through pug mill and to road wheel shaft; dividing plate in pug mill; improved door and additional sieve to sand box; sockets and pins for connecting shafts with the machinery; "application of a screw for moving the piston or pistons for "forcing plastic materials through moulding orifices." Also "the causing the eccentric crushing rollers to move with different "surface speeds."

Employment of ground coal or cinder instead of sifted ashes to mix with plastic materials.

2. Apparatus for boring holes by two drills in the endless chains of plates and moulds.

[Printed, 4s. Drawings. See *Mechanics' Magazine*, vol. 55, p. 258; and *Patent Journal*, vol. 11, 304.]

A.D. 1851, April 26.—No 13,608.

NASMYTH, JAMES, and MINTON, HERBERT.—1. Improved machinery for the manufacture of tiles, bricks, and other articles from disintegrated or pulverized clay, in which a continuous rotary prime moving power is employed to give a slow and gradual pressure on the clay in such a manner as "to allow of "the escape of the air from betwixt its particles, but also to "terminate the consolidating or compressing action with the "advantage of accelerated speed and the accumulated momentum "of the fly-wheel of the machine." The machine also discharges each tile or brick as finished, and refills the emptied mould with a measured quantity of clay. The movements of the mould charger, of the presser or piston, and of a piston which rises after each article has been compressed to elevate it to the mouth of the mould for removal, are all derived directly from the main driving shaft through a system of cams and levers.

2. Placing this machine, if preferred, in a chamber from which the air has been exhausted.

[Printed, 10d. Drawings. See *London Journal (Newton's)*, vol. 42 (*conjoined series*), p. 26; *Mechanics' Magazine*, vol. 55, p. 377; and *Patent Journal*, vol. 12, p. 51.]

A.D. 1851, May 22.—N^o 13,638.

TATE, GEORGE.—1. Dwelling houses constructed with staves of timber or other suitable material bound together by hoops, also fittings for such houses.

2. Improved waterclosets, cesspools, and drains.

3. A mode of preserving timber.

4. A mode of constructing bridges, beams, or girders.

5. A form of collapsible vessels for military or temporary purposes.

6. "Adaptation and manufacture of materials to be employed " in buildings," enumerated as consisting of,—First, bricks perforated longitudinally and transversely. Secondly, channels for circulation of hot and cold air in walls and rooms, and combined with them flexible pipes or diaphragms of light materials adapted to allow the escape of vitiated air, but to prevent the entrance of currents, the wind having a tendency to collapse and close, instead of entering them. Thirdly, manufacture of tiles, pipes, tubes, and bricks by centrifugal action, the clay being fed on to a circular table to which rotary motion is communicated, and having mould cases fitted with open moulds round its circumference. Fourthly, manufacture of corrugated bricks, tiles, or slabs, with the face that is to be seen moulded or ornamented, faced with finer clay or porcelain earth, coloured if wished, and glazed; and forming architectural decorations of pieces of metal glazed and coloured and enamelled.

7. Constructing floating vessels and life-boats in a similar manner to the houses forming part 1.

[Printed, 6s. 4d. Drawings. See *Mechanics' Magazine*, vol. 55, p. 438; and *Patent Journal*, vol. 12, pp. 98 and 110.]

A.D. 1851, July 31.—N^o 13,703.

WORKMAN, JOHN.—This "invention consists in making " bricks, tiles, and other porous earthenware materials non- " absorbent or waterproof." The articles are placed on an endless chain, which conducts them through an oven or chamber heated to upwards of 500 degrees, and through a bath of sugar of lead dissolved in whale or seal oil, into a second part of the heated *chamber*, on emerging from which they are stacked for 14 days.

For less perfect water-proofing linseed oil may be employed in place of whale oil, and less heat will suffice.

[Printed, 1s. Drawings. See London Journal (*Newton's*), vol. 40 (*conjoined series*), p. 184; and *Mechanics' Magazine*, vol. 56, p. 118.]

A.D. 1851, September 4.—N° 13,737.

IMRAY, WILLIAM.—A machine for forming bricks by compression in moulds. Three moulds are shown on the drawing, but some other number may be employed; they are arranged equidistant from each other in a rotating horizontal circular framing, and their inner and outer faces are moveable pistons, the rods of which radiate from the centre of this circle. The tops of the moulds are open when they pass under the hopper at which each in succession is filled, but at other times are closed by a slide. Pressure is exerted upon both the inner and outer piston of each mould by fixed cams, against which friction rollers carried on the rods of these pistons are caused to bear as the framing revolves. After moulding, each brick is ejected from the mould on to a plate, from which it can be removed by hand.

[Printed, 1s. 11d. Drawings. See *Mechanics' Magazine*, vol. 56, p. 217.]

A.D. 1851, October 9.—N° 13,769.

OATES, JOSEPH PIMLOTT.—Machine for manufacturing bricks, tiles, quarries, drain pipes, &c. It consists of a hopper or pug mill, the upper part whereof has the figure of an inverted cone. The middle portion is cylindrical, and the lower part (termed by the inventor the "rectum") is conical or funnel-shaped, terminating in a rectangular figure, corresponding in form and size to the length and breadth of the brick to be produced. The vertical shaft of the mill is furnished with inclined knives on the upper part, and with a continuous blade or screw below, fitting the cylindrical part of the hopper. Immediately under the rectum there is a frame, containing two moulds open at top and bottom, and which slides between two metal plates or plane surfaces. The clay, after being tempered by the knives, is forced by the screw from the rectum into one of the moulds beneath, and then, by a movement of the frame, the filled mould is carried beneath a piston, and the empty mould is brought under the hopper. The sliding of the frame between plane surfaces smooths the upper

and lower faces of the brick; and while the empty mould is being filled, a piston descends, and forces the brick from the companion mould on to an endless web. For making tiles and other articles, the rectum, sliding frame, and pistons are removed, and another rectum and dies of suitable shape are substituted.

[Printed, 9d. Drawings. See *Mechanics' Magazine*, vol. 56, p. 316.]

A.D. 1851, October 23.—N° 13,788.

ADCOCK, HENRY.—Making pipes, chimney pots, and hollow vessels; also bricks, tiles, copings, columns, &c., by “melting the mineral rock or stoney substance, known commonly as basaltes, trap, rowley, rag, or whinstone, or minerals of such like structure, and belonging to the same geological genus, and running the same in a fluid state into moulds suitably formed for producing castings of the shapes and forms desired.”

[Printed, 3d. No drawings. See *Repertory of Arts*, vol. 21 (*enlarged series*), p. 45; *London Journal (Newton's)*, vol. 41 (*conjoined series*), p. 196; and *Mechanics' Magazine*, vol. 56, p. 375.]

A.D. 1851, November 4.—N° 13,803.

BESWICK, ROBERT.—The objects of this invention are,—1. To make bricks and tiles out of such a combination of materials and of such forms as will stand great heat and alterations of temperature; the combination employed being one of “broken seggars,” pounded and sifted, with about equal quantities of fire marl and of red marl.

2. In order better to protect bricks, tiles, quarries, and other articles of pottery, while being fired, to construct kilns and ovens, with flues built of bricks, made of the above-described composition, and having rebated edges, and laid in a cement composed of common and burned sand or grit, red marl, and fire marl. Employing “solid angled bricks,” “cap bricks,” “bridging bricks,” and other bricks of peculiar forms, in constructing ovens or kilns.

[Printed, 7d. Drawings. See *Mechanics' Magazine*, vol. 56, p. 379.]

A.D. 1851, December 1.—N° 13,839.

BURSTALL, THOMAS.—Machinery for making bricks from clay alone, or mixed with other materials, but in a comparatively dry state, by the pressure of steam in a steam cylinder. The steam

cylinder is placed horizontally, its piston having a rod at each side, and each rod in turn acting upon a presser to consolidate clay in one of two moulds. The admitting the steam alternately on one or other side of the cylinder, and the various operations of filling the mould, closing it for pressure, opening it, moving the plunger further to eject the brick, and replacing it ready for a new stroke, are all regulated by cams fixed on one main shaft, and acting upon various combinations of levers, and are alternately repeated at each end of the machine.

A variation is shown, in which the steam cylinder, still horizontal, causes the pressure to be transmitted to vertical plungers, by "a mechanical movement called a toggle joint, or jointed rods;" and the invention includes the use of levers or beams of any of the ordinary methods of construction for conveying the power from the steam cylinder to the plunger, with any corresponding modifications in the cams, levers, and other motive parts which may be necessary.

[Printed, 10d. Drawings. See *Mechanics' Magazine*, vol. 56, p. 476.]

A.D. 1851, December 8.—N° 13,850.

PIDDING, WILLIAM.—Building materials. Forming bricks or blocks, tiles, slabs, &c., "of broken stone, scorix, muriate of alumina, or acetate thereof, mineral earths, fluxes, wood or wood dust, commonly called sawdust, coal, coke, papier maché, naptha, vegetable fibres, pitch, glue, gutta percha, and other articles possessing the requisite properties," mixed with cement. Veneering bricks or blocks with stone, slate, &c. Coating ordinary bricks with a surface of clay of a superior nature prepared with soda ash or sulphate of soda. Coating bricks, &c., with cement.

Making bricks of sulphate of alumina and other substances.

Coating bricks with a varnish composed mainly of silica, with which colours may be mixed, or applying glass to the surface of bricks.

New cements for the purposes above mentioned, in the composition of which silica is mixed in one case with sulphate of lime, sulphate of alumina, and other substances, and in another case with linseed oil and common driers.

Making bricks, tiles, slabs, &c. by "burning coal into coke in

"a mould, adding thereto any of the cements and varnishes heretofore described," and shaping the mixture.

Combining any of the before-mentioned materials with gutta percha or marine glue for building purposes, breakwaters, ships, or other vessels.

[Printed, 4*l*. No drawings. See London Journal (*Newton's*), vol. 42 (*continued series*), p. 110; and *Mechanics' Magazine*, vol. 56, p. 499.]

A.D. 1851, December 19.—N° 13,864.

CLAYTON, HENRY.—1. Improved dies for forming pipes or tubes of plastic materials, in which the core for forming the interior of the pipe is sustained either by bars attached to an inner plate behind the die plate, or by a rod passing up the centre of the piston and piston rod, in order to leave an uninterrupted space for the passage of the material between the core and the edges of the moulding orifice.

2. Dies or moulds "for the formation of pipes, tubes, or tiles, with an enlarged [end] or thickening of material, the die or mould having a door or flap for closing the outer end of such mould or die during the formation of such enlargement," with a view to afterwards removing part of the material at this end to form a socket joint. Also "the employment of conical perforations for the admission and escape of air to or from the mould or die."

3. Tools or apparatus, consisting of cutters with proper guides, "for the cutting or forming of square, rebated, grooved, tongued, bevilled, chamfered, or other forms of jointings to pipes, tubes, tiles, and other articles" inclusive of roofing tiles, previous to their being burned.

4. "Improved means of receiving and supporting pipes or tubes in the course of formation."

[Printed, 10*l*. Drawings. See *Repertory of Arts*, vol. 20, (*enlarged series*), p. 91; *Mechanics' Magazine*, vol. 56, p. 515; and *Artizan*, vol. 10, p. 254.]

A.D. 1852, January 8.—N° 13,890.

ARCHIBALD, CHARLES DICKSON.—(*A communication*).—

1. Machinery for moulding and pressing bricks or other articles made of plastic material. The clay prepared in a screening machine is fed into a hopper, and thence drops into the moulds,

which are fixed in a reciprocating carriage, and pass between two pressure rollers; the moulded article is discharged from the moulds by the action of carriages running on inclined planes, which are caused to accompany the reciprocating carriage in part of its course. Heating the moulding surfaces or the platten of a reciprocating press, and the bottom and sides and followers of moulds, by making them hollow and admitting steam or other artificial heating. Placing projections on the periphery of the pressing roller to give the top surfaces of the bricks a concave or other required form.

2. Machinery "for cutting and shaping articles made of plastic materials, as also stone, wood, and metals," in which a cutter or cutters carried by a system of holders, to which rotary motion is given, makes during part of each revolution of the holder a cut, segmental in shape, upon the front of a stone, which is caused slowly to pass under it; a rocking motion of the whole system being also arranged, which swings the holder up after each cut has been made, so that the cutter in completing its revolution shall be raised clear of the stone, over which it passes. Specially "the arrangements whereby the rocking or tumbling motion is produced, together with the apron or table attached to the rocking shaft, the direct mode of applying steam power to the production of the said rocking or tumbling motion, the peculiar combination of head-stock and mode of adjusting and securing the cutting holders and cutters, the method of making the cutting discs or rings and mounting the same between flanges, the method of using several sets of cutters in the same jaws set at different angles and working in different planes, and the arrangements whereby the feed motion (continuous or intermittent) is obtained," as described in full in the Specification and drawings.

3. Machinery for dressing or polishing stone and other materials, the polishers having rotary motion and being fixed one at each end of a frame, which is free to turn horizontally on an upright spindle in its centre. The materials to be polished are arranged in a circle, so that the ends of the frame will pass over them; and there is an arrangement whereby the polishers can be raised and lowered by the attendant at pleasure, and so moved as to act on every part of the surfaces.

[Printed, 2s. 11d. Drawings. See *Mechanics' Magazine*, vol. 57, pp. 58, 61, and 81.]

A.D. 1852, March 24.—N° 13,911.

PIDDING, WILLIAM.—1. Artificial fuel.

2. The preparation of coke in combination with other materials to produce a substance applicable to many useful purposes, including the manufacture of “bricks, tiles, or other building materials.” The materials added are in some cases “powdered coal, coke, charcoal, or anthracite, all or either;” in other cases, “wax, tallow, starch, or pitch;” and in others metals. The whole to be pulverized, compressed in moulds, and then baked.

[Printed, 4d. No drawings. See *Mechanics' Magazine*, vol. 57, p. 115.]

A.D. 1852, January 24.—N° 13,918.

WOODWORTH, ARAD, and MOWER, SAMUEL.—Improvements in machinery for moulding bricks, tiles, &c. by the action of a “percussion ram” or falling weight. In this machine the ram and its piston or pistons are combined with a mould or moulds, and with a lower expulsion piston or pistons serving the double purpose of first compressing and then expelling the articles made. The clay for each mould is fed from a hopper into a sliding “mould charger” with sides sloping inwards, which accurately measures the quantity; and a “striker” is subsequently caused to pass over its surface, leaving the clay higher at the back than at the front. This charger is now moved over and for the time forms part of the brick mould, into which the clay falls, when the ram is immediately allowed to descend and compress the clay. The ram is now raised, and the mould charger withdrawn, after which the piston under the mould is caused to compress the under side of the brick, and the upper piston, by a different motion from its first, compresses its upper face. Finally this last is removed, and the brick is forced out of the mould by the further action of the under piston, from which position it is dislodged by the face of the mould charger as it returns with a fresh supply of clay. The brick moulds are constructed with “flaring” or inclined sides; and the bricks, after their first and before their second compression, are slightly elevated to free them from the mould and to allow the escape of compressed air.

[Printed, 11d. Drawings. See *Repertory of Arts*, vol. 19 (*enlarged series*) p. 269; and *Mechanics' Magazine*, vol. 57, p. 38.]

A.D. 1852, April 6.—N° 14,054.

OATES, JOSEPH PIMLOT.—The invention forming the subject of these Letters Patent is the same as N° 13,769. By the former Letters Patent the invention was protected in England, Wales, and the town of Berwick-upon-Tweed; and these Letters Patent were granted to extend the protection to the colonies.

[Printed, 9d. Drawings. See *Mechanics' Magazine*, vol. 57, p. 319.]

A.D. 1852, July 6.—N° 14,212.

GESSWEIN, FRIEDERICH.—“A mode of preparing clay, when
“in moulds, in order that the masses may be caused to fill the
“moulds with exactness, and at the same time render the moulded
“masses more suitable for burning by reason of there being
“numerous perforations therein.” The blocks are formed in
moulds with perforated ends, and the objects of the invention are
attained by forcing a series of pointed rods through the mass
from end to end through these perforations.

[Printed, 9d. Drawings. See *Mechanics' Magazine*, vol. 58, p. 76.]

A.D. 1852, July 13.—N° 14,218.

PALM, JOSEPH BARON.—A new construction of kiln, in which
in one kiln, “and with the application of the same heat, common
“bricks, tiles, pipes, and other coarse articles can be baked at the
“same time with any kind of light and delicate earthenware or
“fancy articles, without the necessity of removing or displacing
“any of the articles before the baking of the whole be completed.”
The kiln is to be divided into two stories, each subdivided into
compartments capable of being shut off from, or of communicating
with, one another. Each of the lower compartments has
two furnaces with air gratings, and is furnished with transverse
air channels, and with doors for the introduction of the goods.
In these the coarser ware is baked; while the upper chambers or
“vapour vaults” are to be employed for the lighter and more
delicate wares.

“A system of registers to effect the complete controul, regulation,
and concentration of the heat in the kiln, and also to
“prevent superfluous heat being generated.”

The application of tubes, two or more to each baking cham-

ber, through which the intensity of the heat in various parts of the kiln can be gauged by proper pyrometers.

The external and internal walls should be built with air chambers, "which may be filled with loam, sand, or other non-conducting substances." Fire-bricks may be used for the interior lining, or common unbaked bricks united by loam may be substituted for them.

[Printed, 6d. Drawings. See *Mechanics' Magazine*, vol. 58, p. 76.]

A.D. 1852, July 20.—N° 14,234.

MCHENRY, JAMES.—1. "Improvements in extracting moisture from clay or other plastic material" by conveying it through an oven by the action of large screws working in troughs.

2. "Placing rollers for crushing clay in an inclined position, in order to facilitate the removal of stones mixed with the clay."

3. "Machinery for screening clay or other plastic material;" viz., a hollow drum of iron bars or wire to be set slanting and caused to rotate; and within the same a shaft carrying arms, and either stationary or rotating in a direction opposite to that of the drum.

4. "Combinations of machinery for compressing clay or other plastic material in moulds to form bricks or tiles." The moulds are either fixed on a reciprocating frame or round a circular rotating table, and the pressure is effected partly between upper and under rollers, and partly between under rollers and a fixed plate.

5. Apparatus for removing the brick and at the same time lubricating the mould.

6. Conveying materials from one operation to another by "mechanical agents," such as buckets on an endless belt.

7. "Application of loose mould boxes to machines for making or pressing bricks."

8. "An improved arrangement and construction of kilns for burning bricks or tiles," contrived with various furnaces and an air flue with branches to each, the whole so fitted with dampers that the temperature may be under control.

[Printed, 2s. 5d. Drawings. See *Mechanics' Magazine*, vol. 58, p. 117.]

PATENT LAW AMENDMENT ACT, 1852.

1852.

A.D. 1852, October 1.—N^o 34.

BEART, ROBERT.—A method of “ combining a screening apparatus with a pug mill, in such a manner that the clay or brick earth, in place of being fed directly into the pug mill, is fed into a trough or receiver, and is forced therefrom by a piston, through a grating or screen, so as to separate the stones and roots therefrom before the clay falls into the pug mill.” A cutter is caused to sever the clay behind the grating just before the piston commences to move back, hence any stones or roots in the clay will go back with the piston.

2. “ Constructing the axis of a pug mill in such manner that it may descend through the bottom of the mill and give motion by suitable gearing to the pistons in apparatus such as has heretofore been used for forcing clay or brick earth through moulding orifices,” it having been usual to drive these pistons from a distinct shaft.

[Printed, 2½d. No drawings.]

A.D. 1852, October 1.—N^o 63.

STANFORD, JOHN FORDHAM.—“ Improved machinery and apparatus for manufacturing bricks, tiles, and similar building materials, which is hereby denominated ‘ The Complete Brick-maker.’ ” The framework of this machine is mounted on wheels to render it locomotive. The clay is fed into a hopper on the top of this frame, and passes downwards between two corrugated or other rollers into a pug mill, within which is a screw cutter, “ such pug mill tapering downwards and curving at the lower part to adjust it to the moulds.” The moulds have a removeable bottom, and are fixed on the periphery of a wheel, which in revolving carries “ them through the bottom of the pug mill,

“whereby they receive the charge of earth,” and under a striker or roller to level the top of such charge. The moveable bottom is then caused to rise and force out the bricks, while by a connecting rod the bottom of the mould on the opposite side of the wheel is drawn back ready for a new charge. There is “a falling pallet” to receive the bricks as they are ejected from the mould, and “which is caused to descend and turn so as to place the bricks, &c. on a pallett board fixed on an endless chain to be conveyed from the machine into or along the field.” The empty moulds before being refilled are sanded by “a perforated rose-head,” to which rapid rotary motion is given.

[Printed, 6½d. Drawings.]

A.D. 1852, October 1.—N^o 115.

CARR, CHARLES JOHN.—An improved machine for making bricks and other similar articles, including hollow bricks; consisting “principally of a drum or wheel mounted in horizontal bearings, and furnished round its periphery with one or more series of moulds;” a moveable piston forms the bottom of each mould. An intermitting rotary motion is communicated to this drum, and brings each mould successively under a piston arranged to force into it the clay delivered from a pug mill, the moulds remaining stationary during the operation of filling. Or two or more grooved mixing or pugging rollers may crush and pug the clay, and force it into the moulds. The filled mould is carried by the drum under a curved plate to a compressing roller and below a scraper, and on the mould reaching the bottom of the wheel the brick is forced out on to an endless web, its delivery being facilitated by “a plate or board made to push forward the brick so as to detach it from the piston of the mould.” The mould is then cleansed by passing under a rotating brush. When the clay is very adhesive, the pistons are perforated with small holes and covered with flannel, cloth, or other porous material. The lever which moves the mould wheel is so attached as to be thrown out of gear and stop the machine in the event of any hard substance getting into the moulds. The speed of the mould wheel relatively to that of the pug mill or clay rollers can be varied at pleasure.

For making hollow bricks, core pins of any suitable form are fixed into the bottom of the moulds and pass through holes made *in the pistons*; according at these pins are as deep as the moulds

or shorter, the bricks will either be entirely perforated or solid on one side. Two or more sets of moulds may be fixed to the same wheel. A modification is shown in which "the mould drum is made to rotate continuously instead of with an intermittent motion."

[Printed, 1s. 6½d. Drawings.]

A.D. 1852, October 5.—N° 222.

BÉRARD, ARISTIDE BALTHAZARD. — "The constructing of jetties, breakwaters, and docks, and other hydraulic constructions or portions thereof, in single blocks formed on the spot, or of several blocks, such blocks being in either case formed of an assemblage of bricks or lumps of clay arranged in determinate forms, and united by partial fusion or vitrification." The object is to form a substitute for very large masses of stone in hydraulic constructions without employing concrete or any calcareous cement liable to be acted on by the water. The clay is formed into bricks or balls, which are dried in the sun and air, and then "built up into the form of a block," surrounded by an enclosure either of unburned bricks or "of fire-bricks enclosed within iron frames;" fuel is placed under and round the block, and a layer of it between each layer of bricks. The blocks may be either commenced over burning coals, so that the burning and building up are carried on together, or may be built up and the whole vitrified at once; in either case cold air must be excluded; the cavities which result from the burning must be filled up as they are produced, and a sufficiently high temperature to effect the softening of the mass must be obtained.

Constructions "out of the water or from which the water can be excluded" may be formed "by arranging the courses of bricks and fuel on the spot, and baking and vitrifying the whole in its place."

[Printed 4½d. No drawings.]

A.D. 1852, October 5.—N° 238.

ELLIOTT, WILLIAM GILBERT. — "Manufacturing bricks, pipe, tiles, and other articles capable of being moulded from the slag of the smelting or blast furnaces of iron works, or from a fluid

“ mass of the nature of such slag ” in a melted or fused state ; by running the same into moulds “ and pressing, stamping, or rolling “ and gradually cooling or annealing the moulded masses.”

[Printed, 3½d. No drawings.]

A.D. 1852, October 8.—N° 299.

PASCALL, THOMAS.—“ Improvements in ridge tiles and roofing.” 1. Manufacturing ridge tiles in three separate parts instead of in one piece, so that they readily adapt themselves to the varying angles of roofs. The ridge is formed of two flat tiles, having each one edge turned up in a curved form, so that when two such edges are laid side by side, they can be held together by sliding over them a double clip made in a tubular form with a longitudinal slot.

2. Forming roofing of any suitable materials in tiles or sheets, having both sides curved upwards, so as to be held together by similar double clips.

[Printed, 7½d. Drawings.]

A.D. 1852, October 11.—N° 330.

MOORHOUSE, HENRY.—Machinery for cleansing or tempering clay. A grated or wire cylinder is placed in an inclined position, with a central shaft passing through it, and carrying arms or projections to act as beaters, and driven at a great speed. The cylinder has a slow revolving motion, and water enters it by means of a perforated pipe placed above it. The clay enters the cylinder at the higher end, and is tempered by the beaters as it passes through to the lower end, where it escapes.

This machinery, with modifications, is also applicable to “ cleaning woollen, cotton, or linen rags, and waste.”

[Printed, 8½d. Drawings.]

A.D. 1852, November 17.—N° 771.

WAY, JOHN THOMAS, and PAINE, JOHN MANWARING.—Relates to the manufacture of burned and fired ware, comprising “ bricks, tiles, pipes, fire-bricks, and artificial stone,” &c.; and “ consists in employing natural earths, mineral beds, or strata, “ which contain soluble silica in considerable quantities, and the

“ admixture of these earths (or of soluble silica itself) in different proportions with clay, with or without the addition of lime or other alkalies, for the production, when burned,” of these articles. Also the substitution of soluble silica in the manufacture of porcelain for powdered flint or other insoluble silica.

[Printed, 8½d. No drawings.]

A.D. 1852, November 23.—N° 830.

ARMITAGE, JAMES, and THAXTER, CHARLES.—This “ invention relates to an improved construction of die for producing perforated or hollow bricks, and consists in employing a die fitted with a number of cores, which are held in proper position by a series of core spindles of uniform length, these core spindles being secured” to transverse bars at the back of the die plate. The perforations will be made through the broad side of the brick.

[Printed, 4½d. Drawings.]

A.D. 1852, November 24.—N° 853.

SPALDING, STEPHEN.—“ An apparatus or machine for the manufacture of pan tiles used in building purposes.” “ The machine stands on four wheels, with a box, on which is a moveable lid for putting in the clay, with a lever attached to stop the clay from pressing out. The box is furnished with a moveable end or plunger worked by a rack for pressing the clay through the die that forms the tiles.” The orifice of the die plate corresponds to the section of the tile at the part where the knob occurs. That part of the orifice which forms the knob is closed while the plain part of the tile is passing through by means of a moveable lever confined by a powerful india-rubber spring. The tile as it leaves the machine passes over and turns a roller, which roller, by a pulley, throws into gear a segment working against a cog, so as to raise the lever for a short time enough to allow the knob to pass through. “ In like manner a similar segment and cog works a wire, which cuts the corner out of the tiles.” “ The tiles are then cut into proper lengths, which is done by vertical wires worked from side to side; they are then complete.” Tiles other than pan tiles or

pipes may be made by the machine, which can be worked either by hand or power.

The inventor claims "the peculiar arrangement of driving "wheels and gearing;" the mode described of making the knob simultaneously with the tile itself; the gearing for working the cutter which cuts off the corner; the causing the tile itself by pulleys to govern this gearing; and the making the receiver rather longer than the finished tiles, so that the wire cutter shall cut square the bevelled ends left by the lever. For the arrangement of gearing and driving wheels consult the drawing accompanying the Specification.

[Printed, 5½d. Drawings.]

A.D. 1852, November 26.—N^o 872.

BELLFORD, AUGUSTE EDWARD LORADOUX.—(*A communication.*) *Provisional protection only.*—This invention relates to improvements in the manufacture of bricks. The moulds are fixed on a horizontal table, circular or polygonal, to which rotary motion can be given, and which as it moves carries their contents under the various processes successively. Each mould has its four sides and bottom made of separate pieces, and a stud from each piece goes through the table, and being carried by the rotary motion over stops suitably formed for the purpose, and fixed upon a lower and stationary table, the moulds can be opened or closed and the bottom raised or lowered when required. The mould is first dusted by a dust sieve, consisting of a solid block, the size of a brick, enclosed in a frame very slightly larger; the dust falls through the space between the frame and the block. A small board is now dropped into the mould to form the bottom of the mould. The rotation of the table next carries the mould from the dust sieve to one which fills it with prepared clay roughly shaped to the required dimensions. The bottom of the mould now drops and the sides close in by the action of the stops already referred to, and the further progress of the table carries the mould under a fixed piece of wood, which acts upon a projection in its lid and compresses the clay. A fixed blade now scrapes off the superfluous clay, and a rotating one, combined with the pouring a little *diluted clay* over the brick, polishes the face. The stops lastly *cause the sides* of the moulds to recede. The bricks are taken

out by hand, and are dried in stoves, "on stands placed around a central pivot, by which a rotary motion is given to said stands." There are to be a set of six ovens, of which one is lighted each day, and the heat from them is drawn through the stove by a ventilator and iron tubes.

[Printed, 5½d. Drawings.]

A.D. 1852, December 4.—N° 961.

CLIFF, JOSEPH.—"Improvements in the mode of making and compressing bricks, &c." "The improvements consist in the use of direct steam pressure in lieu of mechanical or other pressure." They are "applicable to the making of bricks or other similar solid articles from disintegrated or pulverized clay, or clay otherwise prepared," and also "to compressing or finishing bricks, pipes, or other similar articles" previously shaped by this or any other process.

The machine for making "bricks or other similar solid articles" contains a large steam cylinder fixed in the upper part of a strong framing to exercise a direct downward pressure. Below the piston rod is a horizontal circular table revolving on a shaft and moved by a smaller steam cylinder by means of a catch attached to its piston rod, so that at every stroke the table makes a quarter revolution. "The moulds merely consist of rectangular or other suitably shaped openings made in the circular table;" they have moveable bottoms, and the piston of the pressure cylinder carries two pressure plates to act on two moulds at once. The piston of each cylinder "works the valves of the other, thus keeping up a series of alternate motions," so that when a pair of moulds have been moved from the clay hopper under the pressure cylinder, the piston in that cylinder descends and the clay is forcibly compressed between the pressure plates and a block fixed below for the purpose. When the pressure plates have been retracted a stroke of the piston in the second cylinder moves away the moulds to where a lever rises and ejects the bricks.

In the apparatus for compressing pipes they are fixed on a "mandril or core" mounted on a horizontal shaft. A die to embrace half the exterior of the pipe is fixed below the mandril, a corresponding upper half is brought down by the steam cylinder,

and with it cutters to cut the pipe to a proper length. The mandril is then caused to revolve on its bearings to polish the interior of the pipe, and afterwards the upper half mould is raised by the piston of the steam cylinder. The valves of the cylinder in this modification of the machine seem arranged to be worked by hand.

[Printed, 1s. 2½d. Drawings.]

A.D. 1852, December 13.—N° 1037.

HAMBLET, JOSEPH, and DEAN, WILLIAM.—The introduction of "slack or coal dust" into the clay of which bricks are to be made, and which "facilitates by its combustion the burning of the said bricks," the mixing to take place in the process of grinding and tempering the clay. One part of coal dust to 60 parts, by weight, of dry clay is usually found to answer, but the proportions may be varied as necessary. Any other "carbonaceous" or solid combustible matter" may be used instead of coal dust, and though the fuel is usually mixed with moist clay, the "invention is also applicable to the manufacture of bricks made from dry clay."

[Printed, 2½d. No drawings.]

A.D. 1852, December 13.—N° 1045.

CLAYTON, HENRY.—"Improvements in brick-making machinery, where the moulding is by forcing the materials through "moulding orifices." This machine contains a pug mill with a vertical central shaft carrying blades of a screwed or twisted form, which force the clay downwards and out of the pug mill through lateral orifices something larger than the required section of the brick. To keep the die plate moist the upper surface of the mouthpiece to each die is perforated, and over it is a water trough having conical perforations "covered with a layer of wool" or other fibrous material," "and over this layer a metal plate, "which can be more or less pressed down on to the wool by a screw to regulate the supply of fluid.

"In front of the die are fixed wires to cut the clay as it passes to the exact section required." To remove from these wires roots or other obstructions the inventor employs "'cleansing forks' or hooks, which fit upon and are made to tra-

“verse up and down on these wires.” “For smoothing the clay in the course of its delivery from the machine” a “self-acting wiper” is described, formed of four endless webs of moleskin cloth or other absorbent material, carried on eight rollers set in a frame. These webs form a trunk rectangular in section, but diminishing a little from end to end so as to compress the clay. A hand wiper of hard wood, similarly covered, and with one projecting edge, may at times be substituted. The stream of clay is received on a frame full of rollers, where a series of wires divide it into individual bricks. The last roller can be moved faster than the others, and so detaches the separate bricks as they reach it, and throws them on to loose pallets laid on an iron plate. The weight of the brick causes the plate to turn partly over, so that the pallet and brick on it can be removed by hand.

An arrangement for cutting an indent in the sides of a brick after it is removed from the machine is described. It is a frame rather larger than a brick, carrying a horizontal axis, to which is fixed an adjustable cutting tool. The axis can be swung partly round on its bearings, and the tool which it carries scoops out the hollow.

[Printed, 7½d. Drawings.]

A.D. 1852, December 21.—N^o 1122.

AKRILL, JOHN.—*Provisional protection only*.—“Improve-
ments in the manufacture of bricks, tiles, and other earthenware
articles. This invention consists of causing the clays or plastic
matters to be heated when preparing, and in using the materials
hot when moulding and shaping the articles.”

[Printed, 2½d. No drawings.]

A.D. 1852, December 23.—N^o 1151.

DAVIS, JAMES.—*Provisional protection only*.—An apparatus for producing perforations in ordinary hand-made bricks, or in tiles. A series of vertical rods, capable of sliding up and down through holes in the bottom plate of an ordinary hand-mould frame, is connected with the brick-making table. The mould is placed on the mould plate and filled with clay, the rods being first driven upwards by a spring or weight connected with them. By

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means of a treadle or lever the rods are withdrawn after the brick has been completed, and the brick is left perforated. By their withdrawal also the rods "will cause the upper surface of the moulded brick to sink slightly in the middle, and thereby a hollow will be produced, corresponding to that usually formed on the under face."

[Printed, 2½d. No drawings.]

A.D. 1852, December 30.—N° 1202.

WARD, JAMES, and BURMAN, WILLIAM.—"Machinery for making bricks and tiles." This "invention consists in certain arrangements of machinery, whereby a sliding table," to which a reciprocating motion is communicated, "with a supply of clay, is caused to present itself under a hollow die or mould, which die or mould, on descending, receives the clay within. It is then caused to ascend, and takes up the clay in it until it comes in contact with a plunger, over which the die continues to rise; whereupon the plunger forces out the partially made brick or tile from the mould on to another portion of the sliding table, which then recedes with its load, and at the same time brings forward upon its further side a fresh charge of clay, ready to be taken into the hollow die or mould as before." This machine is intended to mould any form of brick or tile capable of being produced in a hollow mould.

The Provisional Specification contemplates the employment of endless bands to bring up the clay and remove the bricks, instead of the oscillating table, and also describes an apparatus where clay is expressed through a moulding orifice, cut into the required lengths, and removed on endless bands.

[Printed, 5½d. Drawings.]

1853.

A.D. 1853, January 1.—N° 7.

BROUGH, JOSEPH.—1. "Producing a new manufacture of a vitrified substance," to be denominated "opaline," capable of *imitating coloured or variegated marbles, and facing bricks of fire-*

clay; or common clay, with a coating of this substance. The opaline is to be poured in a state of fusion on to the bricks, they themselves being at a red or white heat. After the whole has cooled gradually, the face is to be polished.

2. "A new kind of vitrified material for building or other purposes," manufactured by forming slabs or bricks of porcelain, to be coloured with vitreous colours, and afterwards fired. Upon this "a colourless glazing or coating of glass is to be laid," to be finished by polishing.

3. Affixing with a vitreous cement ornaments or plain surfaces made of the "compound plastic substance called or generally known by the name of parian," in the soft state, to previously burned bricks or blocks of fire-clay, or other suitable clay, and fixing the same by firing.

4. Manufacture of coffins or sarcophagi from such materials.

[Printed, 5½d. No drawings.]

A.D. 1853, January 13.—Nº 94.

UREN, EDWARD WILLS.—Machinery for the manufacture of "bricks, pipes, tiles, imitation stone, and peat bricks for fuel." This machine has for its basis a sort of pug mill, the clay or other plastic material being thrown into a hollow cylinder, having "from six to ten, more or less, holes in the side at the bottom for the clay to be pressed through into chambers or boxes." A vertical central shaft runs through the cylinder, and has rotary motion given to it; upon this shaft are keyed iron blades to pug the clay, and a cone, which covers the greater part of the bottom of the cylinder. The tendency which this cone alone would have to force the clay out sideways through the holes is assisted by blades of a suitable form, which are fixed to part of its circumference, the other part carrying a rim to prevent the clay so forced through from returning. There is an iron frame fixed in the cylinder to take part of the weight of the clay, and prevent its bearing too heavily upon the cone. Opposite to each opening in the cylinder is a box, with a die plate at the end of it; and slides are made to work horizontally to and fro in these boxes in directions radiating from the central shaft, so that the slide being first drawn into the cylinder, is filled with clay, and then being pushed outward expels its charge of clay through the die plate.

after which it is drawn back for a fresh supply. A self-acting cutter, working vertically in front of each die plate, divides the moulded clay into suitable lengths. The reciprocating movement of the slides is effected by a screw being fixed to each of them, which passes through a little cog wheel, tapped with a screw thread inside; two segments of toothed wheels are keyed on to the central shaft, one above and one below the small cog wheels, and so arranged that first the upper segment and then the under shall gear into each cog wheel in succession, thus communicating rotation in opposite directions, and causing the screws attached to the slides, and which pass through the cog wheels, alternately to advance and recede. The movement of the vertical cutters is communicated by a table, also keyed on to the central shaft, and rotating with it. A rod comes down from each cutter to the surface of the table, so arranged, that when pushed upwards it actuates a system of levers, and brings the cutter down through the clay; small inclined planes, which raise the rods as they pass under them, can be fixed to the table; and the distance apart of these inclined planes, which can be varied at pleasure, regulates the length of the bricks. Instead of a die plate, moulds may be "connected to the boxes; when filled, these moulds may be removed and replaced by others."

A modification of the machine is shown, in which screws with a deeply-cut thread are made use of to force the clay through the boxes to the moulds, in place of the slides above described, and blades of a different shape are substituted for the blades and rim attached to the cone.

The inventor claims the general arrangement of such a machine, the motion above described for actuating the slides, the employment of screws in place of such slides, and "the arrangement of levers and inclined planes for cutting off the moulded materials into lengths as herein-before described."

[Printed, 1s. 1½d. Drawings.]

A.D. 1853, January 29.—Nº 222.

AVINS, HENRY, and TARPLEE, GEORGE.—"A new or improved brick." The improvement consists in "the making of bricks with hollows or openings situated vertically, that is to say, extending from the top to the bottom face of the same."

These hollows may or may not pass quite through the brick. The mode of carrying out the invention described in the Specification shows a brick with two large oblong sinkings going from the one face nearly through to the other, and in the bottom of each sinking two smaller perforations, so that the further face of the brick presents four openings. This face is the one intended to be the upper one when the brick is laid in mortar. The mode of manufacture is not described.

[Printed, 4½d. Drawings.]

A.D. 1853, February 2.—N° 278.

GREGORY, WILLIAM.—(*A communication.*) *Provisional protection only.*—New mechanical arrangements and combinations constituting a brick and tile machine. The clay is to be laid on a metal plate, brought to the required thickness for bricks by passing a roller over it, and then divided by cutters longitudinally and transversely into the requisite sizes for bricks or tiles.

The articles, each resting on a separate plate of metal, are to be burned in trays piled up in a furnace, and so arranged that when the lowest one is withdrawn, the others all descend, so that as baked bricks are withdrawn below, unburnt ones can be put in above.

[Printed, 10½d. Drawings.]

A.D. 1853, February 7.—N° 333.

TABBERNER, JOHN LONDE.—*Provisicnal protection only.*—“The object of this invention is the reduction of granite and similar substances to powder,” with a view to their being employed in decorating the surface of walls, and also being mixed with clay to produce a building material, described to be “nearly equal to stone,” and “at a slight addition to the cost of common bricks.”

[Printed, 2½d. No drawings.]

A.D. 1853, February 14.—N° 383.

FONTAINE MOREAU, PETER ARMAND le Comte de.—(*A communication.*) *Provisional protection only.*—“Constructing tiles, having a flat surface with two channellings which divide it in nearly five equal parts.” Each tile has also a narrow rim at its

lower and its upper end, one of these rims projecting upwards and the other downwards, and their clamping together forms a water-tight joint. Further, "each of the tiles is provided on its left end with a projecting rim, and on its right with a tapering channel, into which the rim of the lower tile," viz., the adjoining tile, "fits to make a perfect joining." Any suitable material may be employed. See also Specification belonging to Letters Patent granted to the same applicant A.D. 1853, N^o 1766.

[Printed, 4½d. Drawings.]

A.D. 1853, February 22.—N^o 450.

HUDSON, JAMES, and HUDSON, THOMAS BAMFORD.—A combination of machinery for the manufacture of bricks, tiles, and drain tiles. "The improvements relate to the means of giving form to the articles, to means of moving the formed articles away when formed, in order to others being continuously made, and to the means of effecting the required movements."

The clay, which must have been previously prepared, is forced vertically down by screws through a hopper into the moulds. The moulds, of which there are several, have each one side left open; they are fixed in a row to a horizontal table, which "has a reciprocating movement given to it, to and fro, through the lower part of the hopper, with rests between each movement for the forcing in of the plastic material into one set of compartments to form one series of article, and also to force out those previously made from the other set of compartments." There is a second table carrying loose plungers fitting the open sides of those moulds that are under the hopper, to which a similar reciprocating movement is given, but in a direction at right angles to that of the first table, and so timed that when the moulds shall have been loosely filled at the hopper, the loose plunger advances to compress the materials; "forcers" are also carried by this table, which remove at the same time the bricks from the previously filled moulds on to a suitable receiver. When pipes are made, a fixed moulding orifice replaces the first reciprocating table.

The reciprocating motion is communicated as follows:—Each table has a horizontal cylinder fixed below it, and having rotary motion, the axis of the cylinder lying in the direction in which the table is free to move. A "grooved runner" fixed to the table embraces a thread or raised band on the cylinder, and as

this thread is made to pass obliquely from one end to the other of the cylinder, and back again, describing a line resembling the figure 8; the runner and the table with it travel from end to end of the cylinder during its rotation.

At each end of the cylinder the band, for part of a revolution runs parallel to its side, and the runner and table will consequently remain stationary while the cylinder performs these parts of its revolution.

[Printed, 6½d. Drawings.]

A.D. 1853, March 8.—N° 583.

BAKER, CHARLES.—This invention relates to improvements in moulds for making perforated bricks by hand. The bottom of the mould is fixed to the moulding table, and is pierced with holes to admit a series of "upright projections of the form it is intended to give to the perforations or hollows in the brick;" these are fixed to a frame under the table; the distance they project is regulated by screws, and they are ordinarily held in place by springs, but can at pleasure be withdrawn downwards by means of a treadle. On to this bottom the upper part of the mould, which "is similar to those ordinarily employed, and is used in the ordinary manner of moulding solid bricks," is placed. The moulder will throw and press brick earth into it, and strike off the excess in the usual way; he will next "cause the upright projections to descend by treading down the treadle," after which "the mould and brick are lifted off from the bottom of the mould, and the brick is delivered on to a board or pallett in the usual manner."

[Printed, 6½d. Drawings.]

A.D. 1853, March 8.—N° 586.

SAMUELSON, ALEXANDER.—An apparatus designed to work the air plugs or valves in such brick and tile machines as act by the expression of clay through moulding orifices, so that instead of these valves being opened by hand from time to time for the escape of condensed air, they "may be opened regularly by the working of the machine." Any method of working the valve "by means of any combination of mechanical parts actuated by one or more of the moving parts of such brick and tile ma-

“chine” is included, but the inventor claims “more particularly the combination of parts and gearing” “shown in the accompanying drawing.” Here cams are fixed to the driving wheel of the machine, and these, as they revolve, set in motion a system of levers arranged to open the valve, which is afterwards closed by a spring.

[Printed, 5½d. Drawings.]

A.D. 1853, March 16.—N° 649.

KNIGHT, GEORGE, and HERITAGE, JOHN.—This invention consists in “the application of steam and hot water to the heating of kilns, ovens, flues, or chambers in which bricks and other articles made of clay are dried prior to the burning of the same,” with a view to obtain a more equable temperature than by the use of hot air.

The apparatus described consists, where steam is employed, of a boiler communicating through a feed pipe with a series of steam pipes laid parallel to one another along the floor of a kiln. The supply of steam to each series can be regulated separately, and there are pipes to convey the condensed water back to the boiler. A temperature of 120 deg. Fahrenheit is preferred, and a current of air is allowed to pass slowly through the kiln to carry off moisture as it rises from the articles that are being dried.

An arrangement of pipes for employing hot water is also described. On this plan systems of pipes, filled with water, leave a hot-water boiler, at its higher sides, and after being made to pass over the floor of the kiln, return to the lower part of the boiler. The temperature of the water is kept below boiling point, and an expansion tube or cistern provided; and the whole system of pipes being laid on an incline, the difference of density between the hotter and colder water keeps up a circulation through the pipes.

[Printed, 9½d. Drawings.]

A.D. 1853, April 26.—N° 1001.

PYM, JOHN.—*Provisional protection only.*—Improvements in building materials.

The inventor says, “I form pieces or blocks of any given size required for building by covering or facing common brick,

“ slate, stone, earthenware, concrete, or other suitable material
“ with slate, marble, stone, or earthenware. I cement the two
“ together to form a brick or block.”

[Printed, 2½d. No drawings.]

A.D. 1853, May 4.—N° 1090.

HUTCHINSON, JOHN HOUSEMAN.—*Provisional protection only*.—Improvements in ventilating bricks.

These bricks are shown as formed with two deep channels or apertures, one on each side of the brick, running from the top downwards, but “ the apertures are not carried right through the
“ brick, and are only continued about one-half or two-thirds of
“ the distance from the top. When the bricks are put together,
“ a zig-zag opening or ventilating chamber is formed, extending
“ to the distance required,” the intention being apparently to provide a channel for the access of air from the outside to the inside of a brick wall.

[Printed 4½d. Drawings.]

A.D. 1853, May 9.—N° 1134.

BEAUMONT, EDWARD BLACKETT.—This invention relates to an improved method of constructing the roofs and gutters of buildings, and to peculiarly-shaped bricks and tiles to be employed in forming them.

1. The inventor proposes to cover buildings with a roof composed of independent arches of bricks placed side by side and forming a vault, the springing of the vault to be from a course of bricks so shaped as to form at once a skew-back for the arch and an eaves gutter, and tied to the corresponding course on the other side of the building by iron rods. The bricks forming the arches are curved; they are rebated at the ends, and each ring fits into those to the right and left of it with a tongue and groove joint; over this joint is a slight elevation on the outer surface of the bricks, at their sides, so as to prevent water from lodging on the joint; the whole to be put together with mortar or cement.

2. Employing strips of metal, felt, or other substance to cover the raised joint already described, so as to render it more water-tight.

3. Forming “fall pipes for conveying the water from the gutters

“ of roofs ” of tile socket pipes made in lengths, and building into the wall, at distances above one another corresponding to the lengths of pipes, bricks intended to project, and having in their projecting ends a countersunk hole fitting the sockets of the fall pipes ; these pipes to pass through such bricks and are to be “ sustained by the enlarged part of the pipe resting in the enlarged “ or countersunk part of the orifice in the brick.”

[Printed, 7½*d.* Drawings.]

A.D. 1853, May 11.—N° 1167.

WHITTAKER, EDMUND, and WALMSLEY, JAMES.—“ Application of the direct action of the elastic force of air for the “ purpose of compressing clay into or through dies or moulds “ used in the manufacture of pipes, tiles, bricks, or slabs.”

Two modifications of machinery are described ; in the first air is compressed by pumping it into a vessel resembling a steam boiler, and acts on the piston of a cylinder arranged like that of a steam engine, with the piston rod carrying a plunger which, when the piston descends, forces the clay through moulding orifices. A second cylinder and piston are employed to move up the mould or core to the moulding orifice, and subsequently withdraw it. In the second arrangement the piston is acted upon by water impelled by the pressure of a column of highly compressed air.

[Printed, 5½*d.* Drawings.]

A.D. 1853, June 4.—N° 1378.

BEAUMONT, EDWARD BLACKETT.—“ Bricks having indentations, holes, or hollows on one or both of the beds or broad “ sides, as shown in the drawings annexed,” the object being to combine strength and lightness, to obtain a better key than with ordinary bricks, and to use a form of brick capable of being subjected, during its manufacture, to any degree of pressure the clay will bear. The hollows are not perforations through the entire brick, and those on the two beds may be dissimilar in form or number.

[Printed, 6½*d.* Drawings.]

A.D. 1853, June 22.—N° 1524.

GEEVES, WILLIAM.—*Letters Patent void for want of final specification.*—Improvements in brick-making. A shallow “carriage to run on a railway,” and about the depth of a brick, is to have placed over the bottom of it pallets, each the width and length of a brick. Brick earth is then to be filled and pressed into the carriage and levelled, and afterwards divided by wires into a series of bricks corresponding to the pallets.

A.D. 1853, July 1.—N° 1583.

BRADLEY, RICHARD, and CRAVEN, WILLIAM.—“An improved machine for the making of bricks, tiles, and earthenware.” In this machine “a pug mill, working with a vertical shaft,” driven in the usual way, “is placed over a horizontal circular table connected with the shaft of the pug mill, and rotating with it.” This table has a series of cavities, into which moulds of any required form are fitted. Knives on the shaft of the mill force the clay downwards, and others at the base of the shaft force the clay into the moulds as the revolution of the table brings each mould successively under the mill. A piston fitted with a rod, carrying a roller, and working in guides, forms the bottom of each mould, and the progress of the table causes each roller in turn to travel up an inclined plane, thereby exercising an upward pressure through the piston upon the clay. This pressure is met by “a flat plate of metal covering the upper orifice of the plate or mould, and fixed to the framework of the machine, and of sufficient strength.”

The further rotation of the table carries the mould away from under this plate, but over a second inclined plane, which causes the piston to eject the brick.

“To prevent any exudation or deposit between the table and the pug mill, two or more rollers,” adjustable by screws, support the table and keep it close to the face of the pug mill.

[Printed, &c. Drawings.]

A.D. 1853, July 12.—N° 1657.

SAMUELSON, MARTIN.—Brick and tile machines. The inventor lays claim to,—

1. *The general arrangement of machinery described by him.*

and in which the clay is fed out of a vertical receiver into a smaller horizontal "working chamber" beneath, with moulding apertures at each end. A plunger traverses this chamber, and is connected through a properly protected slot with hydrostatic apparatus fixed below and described under Nos. 4, 5, and 6; this plunger drives out the clay alternately from the two ends of the working chamber.

2. Use of direct hydrostatic pressure in forcing plastic material through dies.

3. Application of such pressure or steam pressure to "Beart's patent brick and tile and pipe machines."

4. "Actuating clay moulding apparatus by means of duplex pressure cylinders."

5. "Application and use in clay moulding machines of traversing pressure cylinders or chambers and stationery pistons." The duplex traversing "pressure cylinder," to which is connected the plunger in the working chamber, traverses horizontally to and fro along a fixed rod carrying a piston. Water under pressure is admitted alternately at either end of the cylinder to actuate it.

6. Application to such machines of "reversed pressure cylinders," which are stationary, with traversing pistons.

7. Application to this manufacture of the "tumbler movement" described in the Specification. This includes a horizontal tube, closed at the ends, and containing a ball, and fixed on a shaft which reverses the slide valves of the machine. The strokes of the plunger are made to raise alternately one or other end of this cylinder, upon which the ball, rolling to the lower end, carries the cylinder further round, and completes the reversing motion.

[Printed, 11½d. Drawings.]

A.D. 1853, July 14.—N^o 1679.

LOOKER, BENJAMIN, junior.—The manufacture of perforated bricks, with the intention of facilitating the cutting or dividing the bricks into parts. The "invention consists of making bricks with transverse slits or openings through them at those parts where it is desired they should be divided."

[Printed, 5½d. Drawings.]

A.D. 1853, July 20.—N° 1718.

NORTON, JAMES SHIELD, and BORIE, HENRY JULES.—The nature of this invention is the making of tiles for roofs, and also stairs, “hollow, or with hollow channels through them, by which “great strength and lightness will be obtained, and the same will “admit of being better burned or fired. For this purpose plastic “materials are to be forced through dies of the form suitable to “produce the external contour of the tiles or stairs, and in such “dies cores are placed to produce the hollow channels.” The plastic materials may be either such as, like clay, require burning, or such as will set and get hard without burning. The tiles or stairs are formed either by forcing the plastic material through dies having moulding orifices and cores suitable to form the perforations, or else in a hollow mould made in two parts, and hinged together, and having cores within it that can be withdrawn at pleasure; after the material has been forced into this mould by a piston, the cores are withdrawn, and then the mould is opened and the tile or stair can be lifted out.

[Printed, 6½d. Drawings.]

A.D. 1853, July 27.—N° 1766.

FONTAINE MOREAU, PETER ARMAND le Comte de.—(*A communication.*)—“The construction of metal, glass, or gutta- “percha tiles for roofing, with corrugations and overlapping “sides.” The tiles are figured, and described as in the Provisional Specification of this inventor A.D. 1853, No. 383, which see; they may, however, be made with one channel, and “the dimensions “and form of the tiles may vary according to the kind and “quality of the materials employed; the form of the jointing, “however, remains the same.”

[Printed, 7½d. Drawings.]

A.D. 1853, August 1.—N° 1797.

MAY, CHARLES.—1. The first part of this invention “consists “of the application of a reservoir of water under great pressure, “or, as it is termed, an ‘accumulator,’ to the ordinary hydraulic “press when used in the manufacture of bricks.” When a hydraulic press is employed in a brick machine, the pipe from the

force-pump to the press is made to pass through the "accumulator," which consists of a fixed hollow piston and a heavily-weighted cylinder free to rise perpendicularly when water is pumped through the piston into it. Whenever the hydraulic press ceases to act, a cock is turned, stopping the flow of water into it. The force-pumps being still worked, now act upon the accumulator, and cause it to rise. Whenever the cock communicating with the press is again opened, "the fluid from the "cylinder," or accumulator, "discharges into the cylinder of the "press, so as rapidly to bring it up to its work."

2. "The use of moulds in combination with pins and apparatus "as described for pressing and forming perforated bricks." When pressing such bricks, those formed under Beart's or any similar process are taken when partially dry and placed in a mould, where they are compressed between a fixed top carrying pins to preserve the perforations in the brick, (below which top is a perforated plate moving from the top downwards in the mould,) and a plunger working upwards, and having perforations to fit the pins and cross perforations for clearing away dirt. After the brick has been sufficiently consolidated by pressure, the plunger is withdrawn, and the plate in the mould is caused to descend and expel the brick downwards.

In forming perforated bricks, the clay is used "reduced to "powder, and in such state as will admit of coherence by pressure." Both at the top and bottom of the mould plungers carrying short pins compress the clay; the ends of these pins pass each other within the brick, and are so shaped as to exercise a lateral pressure, so as to produce "holes of larger area "inside than at the orifices." A perforated plate is attached to the upper plunger by springs. For parallel perforations an arrangement very similar to the one for consolidating bricks is described, including a plate bearing pins, a perforated plate sliding on the same, and a perforated plunger. The dried clay may be rendered properly moist by sifting it through a jet of steam, but no claim is made for this process.

[Printed, 6½d. Drawings.]

A.D. 1853, August 3.—N^o 1814.

STANSBURY, CHARLES FREDERICK.—(*A communication.*)—"Improvements which have reference to the construction and

“employment of an improved brick press.” In this machine a pug mill expresses the clay into a “mould charger,” or vertical box with a piston moving perpendicularly within it, which piston, when the mould is brought under the mould charger, is caused to descend and charge the mould with clay. A portion of the lower part of this box is made moveable, so as to yield should any stone or root in the clay come in its way. The moulds are fixed on a reciprocating carriage, and their height is adjustable by screws, so as to admit of the introduction of moulds of various depths; the carriage moves them first under the charger to be filled, and thence out from the machine to be emptied, and at each end of its journey it remains stationary. The inventor claims as new,—

(1.) The motion actuating this carriage, and which dispenses with reversing gear. A bar of metal forking out into two limbs, an upper and an under one, is fixed to the under side of the carriage, and each limb carries a stud, while between the arms a revolving shaft passes, which carries a short arm so arranged that as the shaft rotates the arm will come in contact first with the stud on the upper limb of the fork, which it drives before it for part of its half revolution, and then for a corresponding part of its second half revolution with the stud on the lower limb of the fork, which it drives back again.

(2.) A mode of regulating the pressure upon the clay of the piston in the charging mould by a means of altering the length of its stroke. A slot is made in the lever which works this piston, and two corresponding slots in its bearings, and a pin passing through all three forms the fulcrum. As the ends of the lever can only move vertically, it is obvious that by sliding this pin horizontally in the three slots the fulcrum is shifted, and the relative lengths of the two arms of the lever changed “so as to regulate the extent of the depression of the piston.”

[Printed, 6½d. Drawings.]

A.D. 1853, August 5.—N^o 1833.

GARFORTH, WILLIAM, and GARFORTH, JAMES.—*Provisional protection only.*—In a brick-making machine where the clay is driven out at the end of a cylinder by a piston, attaching that piston directly to the end of the piston rod of an ordinary steam engine, so as to avoid the use of gearing of any description.

A.D. 1853, August 5.—N° 1834.

HUNT, ROBERT.—*Provisional protection only*.—"An improved tile and an improved method of making tiles." This tile is a "flat and thin slab of burned clay," to imitate split slate, "obtained by forming the tiles in groups of various number, drying, and burning them in compact blocks capable of being afterwards separated." This is to be effected by fixing in the throat of a clay-pressing machine, knives "either solid or hollow for the purpose of injecting any non-adhesive solution," and subsequently compressing the separated slabs into one block again.

A.D. 1853, August 12.—N° 1888.

TIZARD, WILLIAM LITTELL.—"New combinations of materials suitable for buildings."

(1.) Panels, doors, &c., into which iron is introduced.

(2.) Combinations suitable, among other purposes, to bricks, also "tiles, slabs, or plates for roofing and flooring," and made "by combining plastic mixtures of earthy, animal, and vegetable substances with woven wire, or iron sheets or strips, perforated or otherwise."

(3.) Machinery for "spreading or otherwise applying the said plastic composition on the surface or surfaces of the said woven wire or perforated metal," and which "consists of tables and rollers made hollow and heated by steam for the purpose of keeping the compositions in a plastic state," a spreading knife, and a pressing apparatus.

[Printed, 3½d. No drawings.]

A.D. 1853, August 17.—N° 1921.

HERITAGE, JOHN.—This invention is an improvement in the manufacture of bricks, or any other articles made by expressing plastic materials through moulding orifices, and consists in the employment of water to aid in smoothing the surfaces of the articles moulded.

"A mould, or die, or mouthpiece," made hollow, and containing water, is fixed in front of any ordinary moulding orifice, to which it must be precisely similar in size and form of opening,

so that "the stream of clay issuing from the ordinary moulding " orifice " of any brick-making machine, "after being wetted " with water, shall be smoothed by passing through the said " mould."

[Printed, 6½d. Drawings.]

A.D. 1853, August 17.—Nº 1926.†

GRIMSLEY, THOMAS.—"Improvements in machinery for the " manufacture of bricks, tiles," &c.

The first part of the machinery consists of two fluted conical surfaces forming the top and bottom of a pug mill, the upper surface being in an inverted position; both are free to revolve round a main central shaft; between these work one or more horizontal conical rollers, also fluted, so that by causing only one roller or one surface to revolve, the entire series is set in motion. Clay is fed through an opening in the upper surface and drops through one or more openings, or through perforations between the flutes, in the lower roller into a clay box. Sometimes the upper surface is omitted and the lower one made a fixture.

In the clay box is a "revolving scraper or coulter," to collect the clay and express it out of the clay box "into the moulds, " or through the dies fixed at each end of the press, either horizontally or vertically." A frame traversing below the clay box carries two pistons, which exert a compressing force alternately at one or other end of the machine on the clay in the moulds when moulds are employed. After the contents of a mould have been consolidated, the outer end of it is by the machine drawn backwards and then upwards, and a further movement of the piston expels the moulded article, which is received on a carriage that removes it. A wire cutter is caused to sever the clay from the piston.

All the motions are communicated to the different parts, either directly or through levers, from slides moving horizontally in proper bearings, and these slides are set in motion by cams keyed on to the central shaft, the exact positions and shapes of the cams being so regulated as to make the different motions follow each other continuously.

[Printed, 1s. 0½d. Drawings.]

B. & T.

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A.D. 1853, August 25.—N° 1977.

AUSTIN, WILLIAM.—“Blocks of plastic material for building “ purposes.” Two series of blocks are to be made, and in building a block from one series and one from the other are to be laid alternately. Each block has its upper and under surfaces parallel, and its two ends also parallel; but the blocks of one set have their sides convex, and those of the other set have their sides concave, so that, when properly laid, the convex side of one fits the concave side or end of the neighbouring block. Each block has two holes vertically through it, which, in building, produce vertical hollows the entire height of the wall. The convex and concave sides are shown on the drawings as angular, but they may also be composed of curved surfaces.

[Printed, 5½d. Drawings.]

A.D. 1853, August 27.—N° 1995.

ROBINSON, GEORGE.—This invention relates to “the formation “ of sheets, plates, or slabs of various thicknesses from the slags “ or refuse matters obtained during the manufacture of metals.” The slag is either used hot as it leaves the furnace or after being reheated; it is to be poured in a molten state upon a table “artificially heated,” and formed into a slab of the requisite thickness by rolling or any other suitable means. The sheets so formed are to be placed in an annealing furnace, and then gradually cooled. Also “the application of sheets, plates, or slabs thus formed “ to roofing and other useful purposes.”

[Printed, 3½d. No drawings.]

A.D. 1853, September 7.—N° 2060.

GRIMSHAW, WESTON, and ROWLAND, ELLIS.—“The “ object of this invention is to make bricks of dry clay by its “ compression in a mould. The improvements consist, firstly, “ in the use of a piston in a steam cylinder acting in a direct “ manner on a pallett or die, which forms the bottom of the said “ mould; secondly, in the use of blocks or pins in combination “ with such piston for the formation of perforated or indented “ bricks.” The moulds are contained in a circular plate fixed horizontally and turning on a central axis, and a table, fixed below this plate on the same axis, communicates motion to the whole machine; this table revolves with an intermitting motion, and at

each forward movement carries the mould plate so far forward as to bring each mould into the position just occupied by the one before it. Each mould in its first position receives a supply of brick earth, it next passes between a fixed cover which closes it at the top, and the piston rod of a steam cylinder which, rising from below, compresses the clay by the direct action of the steam in the cylinder directed through the piston and piston rod against the pallet or moveable bottom of the die; the mould is next moved from under the fixed cover, passing at the same time over an inclined plane, which forces the pallet to rise further, and expels the brick. The pallet is lastly drawn back to its former position by a second incline.

Where perforations are required, pins are fixed to a plate below the lower part of the mould, and pass through perforations made for the purpose in the pallet or moveable bottom into the mould itself.

[Printed, 6½*d.* Drawings.]

A.D. 1853, September 7.—N° 2062.

HUSTWAYTE, BENJAMIN, and GIBSON, RICHARD JOHN PAUL.—“ This invention relates to the manufacture and use of an “ improved plastic composition, which, when moulded into bricks, “ tiles, or other articles will set quickly, and will require no firing.” The essential components are washed sand or ballast, blue lias or Dorking lime, and Portland or Roman cement. Colouring matter may be added if needful, and after the ingredients have been mixed dry, hot water is added, “ with stirring,” and the composition cast into moulds. The proportions of the different ingredients and colouring substances which the inventors find most advantageous are given in the Specification, but may be varied.

[Printed, 3½*d.* No drawings.]

A.D. 1853, September 15.—N° 2150.

BARSHAM, JOHN.—A machine adapted to mould a number of bricks or tiles at once, and to convey them to the drying ground in the moulds. Metal moulds are employed, and a number of them are placed side by side in a carriage mounted on wheels, moving along a railway. A pressing roller or rollers heavily weighted are mounted on a second carriage which runs on rails fixed on the top of the first carriage, or on a second fixed railway; or else the roller is simply so fixed that the first carriage may pass under it.

The clay having been thrown into the moulds, is pressed into them by this pressing roller, and the superfluous clay is removed by a scraper; after which the carriage is removed to the drying room, and the bricks still in the moulds are piled to dry; when dry they will readily leave their moulds.

"The pressing roller is covered with cloth or fibrous material, which is constantly kept moist by water." The metal moulds are prepared, "whilst in a warm state, by dipping them into a mixture of chalk and water," allowed to dry before they are filled.

The details may be varied, and in small works the placing the series of moulds on a carriage on a railway is not essential.

[Printed, 10½d. Drawings.]

A.D. 1853, September 28.—N° 2221.

BARSHAM, JOHN.—A modification of the invention described in the Specification to Letters Patent granted to the same inventor A.D. 1853, September 15, N° 2150. In place of the series of metal moulds, a series of boards are employed, each the size of several bricks, and all placed side by side at the bottom of a trough or tray. The brick earth is filled into this trough and levelled as before described, and the mass is then cut by wires or knives into slabs, each the size of one board; the boards are then removed singly to a machine, where a second series of cutters divides each slab into the proper number of bricks; after which they may be dried on the boards, or removed from them for the purpose of being dried as found convenient.

The same modifications in details are admissible as in N° 2150.

[Printed, 10½d. Drawings.]

A.D. 1853, October 4, N° 2267.

SMART, NEVIL.—*Provisional protection only.*—"This invention relates to making bricks when the brick earth is forced through "moulding orifices," and consists in employing such dies as shall produce one or more "grooves on the upper and under surface of each brick to receive the mortar or cement." Bricks to be used as "stretchers" to have these grooves longitudinally; and those to be used as "headers" to have them transversely. When the bricks are made hollow, the hollows are to run in the same direction as the grooves.

[Printed, 2½d. No drawings.]

A.D. 1853, October 6.—N° 2288.

GEEVES, WILLIAM. — This invention is described by the patentee as “ the manufacture of bricks by combining clay or brick earth immediately before moulding with sawdust or other matters which act as dryers or absorbents of moisture, and also the combination of apparatus herein described for moulding perforated bricks.”

The absorbent is to be of such a nature as will both hasten the drying and facilitate the burning of the brick ; it is to be used as dry as possible, and mixed with the clay immediately before moulding. These bricks dry most rapidly when perforated. One method of drying the perforated bricks is to pile them with the perforations over one another, and blow a current of air through them.

They may be burnt in clamps with “ between each layer of brick a little ground breeze or coke ;” and when the absorbent is very dry, the bricks may be fired without any preliminary drying.

The apparatus for perforated bricks consists of a brick mould fixed on a frame, and open at the top ; a piston attached to a lever, and with perforations answering to those to be made in the brick, forms the bottom. “ Spikes,” which can be driven up by raising a separate lever, work up and down through the apertures in the piston. The mould is to be first filled with clay, as in moulding an ordinary brick ; after which the lever actuating the spikes is raised, and they are thus forced up through the clay, forming the perforations ; the other lever is then raised, and, lifting the piston, causes it to force out the finished brick.

[Printed, 6½d. Drawings.]

A.D. 1853, October 8.—N° 2312.

CLAYTON, HENRY.—A method of forming a die or moulding orifice to any machine intended for “ the manufacture of bricks and tiles by forcing earth in the plastic state through moulding orifices.” This “ invention consists of constructing each moulding orifice with two moving surfaces and two fixed surfaces. The two moving surfaces consist of rollers, which are put in motion by the passage of the plastic earth between them, the interior of the moulding orifice where the rollers come being arranged to direct the plastic matter between the rollers.” The whole die

has internally a form approaching that of a truncated pyramid, so that the clay is compressed as it approaches the rollers at the orifice.

[Printed, 6½d. Drawings.]

A.D. 1853, October 11.—N° 2336.

PORTER, JOHN FRANCIS.—Improvements in machinery for preparing brick earth, also in machinery for moulding bricks and similar articles. In preparing brick earth, where it is necessary to pass it between crushing rollers, the inventor proposes to employ an elastic force, either that of the atmosphere or of some such material as india-rubber, to keep the rollers close. Two rollers are provided for, the bearings of one of them being fixed, while those of the other are allowed to slide, so as to vary the distance between the two. In one arrangement these bearings are pressed upon by the short arm of a bent lever, the longer arm being acted upon either by the force of an india-rubber or other elastic strap, or by the pressure of air on a piston working in an air-tight cylinder from which the air has been more or less completely exhausted. In another arrangement elastic cushions are so placed as “to press directly on the axle bearing of roller.”

In the machinery for moulding bricks a pair of rollers force the brick earth down a strong chamber or chambers into a mould or set of moulds at one end of the table, having a reciprocating movement. When the pressure has been long enough continued, the motion of this table removes the filled moulds, which are passed under a scraper to complete the form of the article, while the second set of moulds are at the same time brought into a position to be filled in turn. The bottom of each mould is formed by a plunger, which, its lower extremity being made to travel over an incline plane, is caused to rise in proportion as the mould gets further from the clay chamber, and thus the bricks can be forced out.

In consequence of the compression which the clay or brick earth receives, articles may be moulded in a nearly dry state.

[Printed, 11½d. Drawings.]

A.D. 1853, October 17.—N° 2388.

CHANTRELL, GEORGE FREDERICK.—This invention refers to improved apparatus for the manufacture of animal and vegetable charcoal, consisting of a kiln full of chambers separated by horizontal and vertical partitions formed in tile and supported by blocks of fireclay.

Also "the jointing and form of the pier blocks, or lumps, and "the tiles used to form the retort chambers." The blocks are built up to form piers, they are "grooved vertically on the sides "to receive the ends of the tiles forming the sides of the chambers and horizontally on the ends to support the tiles forming "the draught floors," they themselves acting as ends to the said chambers." The tiles for floors are plain, and three inches thick, but those acting as sides to chambers are rebated at each side where they fit into the blocks, and each one has a **V** groove at top and a corresponding projection underneath to fit into the groove on the top of the tile below. The blocks may be constructed hollow and with lateral perforations, so as when built up to form a chimney with a communication into each chamber, affording an outlet for gases or effluvia. "The whole of the tile and brick-work forming the structure where the heat acts upon it is laid "and run in with fireclay lute, about the consistency of treacle."

[Printed, 1s. 6½d. Drawings.]

A.D. 1853, November 8.—N^o 2591.

CHAMBERLAIN, HUMPHREY.—This invention consists of,—
1. A combination of apparatus for making bricks, tiles, or tubes by expressing plastic material through a moulding orifice, the separate parts not being themselves claimed as novel. The clay is first expressed through an orifice larger than the finished brick, but of adjustable size, and then receives the exact sectional form required by passing a "mouthpiece" made up of four rollers (driven at like surface speed) covered with porous fabric. The stream of clay is then cut into lengths and the finished bricks removed by hand.

The cutting is effected by a wire carried in a frame working from side to side, but working obliquely, the angle of its path being so arranged with reference to the speed of the stream of clay that a true cut shall be made. This frame works in bearings which move on a pivot, and while it is traversing it bears against a pin which causes the angle to be preserved. When the cut is completed, a slot in the frame allows it to pass the pin, and an india-rubber spring draws it round, till, having reached the proper angle, it bears upon the pin which guides it in the return cut. The reciprocating movement is given by a "mangle pinion" having an universal joint, and acting by turns on the upper and under

surface of a toothed rack fixed to the frame. A roller supports the earth while being cut.

2. The manufacture of hollow bricks or tiles by fixing two or more grooved rollers in front of the expressing machine, with cores or mandrills so fixed between them as to form the hollow of the tube or brick, while the rollers determine its exterior figure. The stream of clay from these rollers is cut into lengths in the same manner as above described for solid bricks.

[Printed, 10½d. Drawings.]

A.D. 1853, November 19.—N° 2691.

AUSTIN, WILLIAM.—Forming tubular tiles “of brick earth, or clay, or plastic material, or glass,” so that externally “the tubes will be six-sided, and consequently pack without loss of space.” The bore may be either cylindrical, or, following the exterior, hexagonal. In some cases the tubes are made in two portions or even more; these parts are then to be so made that when put together they shall form a tube having externally six equal sides. The drawing shows several methods of doing this, and also “a convenient means of binding the parts together” by a band of metal, the ends of which are held together by a clip.

[Printed, 5½d. Drawings.]

A.D. 1853, November 24.—N° 2739.

JONES, WILLIAM.—A machine for moulding bricks. This machine contains a pug mill with its central shaft vertical and prolonged downwards to drive the other portions of machinery placed below it. In the bottom plate of the pug mill are two openings for the supply of clay, and two brick moulds are fixed in a reciprocating horizontal frame immediately under the pug mill, and occupy such positions that when one is being filled the other shall be clear of the pug mill. The necessary reciprocating movements are given to the frame by means of cams or an eccentric on the central shaft. A piston, capable of being moved upward, hangs in the lower part of each mould, and upon this the charge of clay is allowed to fall. When the mould is full the action of the machine moves it under a solid portion of the bottom plate of the pug mill, and at the same time a cam carried by a horizontal wheel at the lowest part of the machine and keyed on to the central shaft raises the piston and consolidates the brick. The mould is now moved further, and a second cam, by further elevating the piston

ejects the brick, at the same time that the mould at the other end is being filled.

Perforated bricks or hollow bricks may be made by combining suitable plugs or dies with the piston, and providing suitable cams to force them up at the right time into the clay in the mould.

[Printed, 10½d. Drawings.]

A.D. 1853, December 14.—N° 2904.

JOHNSON, WILLIAM BECKETT.—The inventor observes, “my invention refers to a method of pressing clay, artificial fuel, or other plastic material into moulds, and consists in adapting two or more pistons to each of a travelling set of moulds in conjunction with suitable apparatus for causing the said pistons to advance gradually towards each other so as to press the material on more than one side by a continuous action as the moulds travel onward. The peculiar character of my invention may be adapted to machines of various constructions.”

In the construction described and shown by drawings a frame carrying open moulds, the sides of which moulds are formed by moveable pistons, has a reciprocating movement along a table. The moulds, after being filled, are carried by the movement of the frame between two rails on which the pistons travel; the rails being curved so as to approach each other, drive in the pistons laterally, all escape of clay being prevented by the table below, and an iron plate above closing in the top and bottom of the mould. Before reaching the end of the traverse the side pistons are retracted, and the top and bottom of the moulds left uncovered, so that other pistons working vertically can eject the bricks. One half only of the moulds are filled at one time, and the machine discharges alternately at either end. A third piston to give vertical pressure might be added to each mould.

[Printed, 6½d. Drawings.]

A.D. 1853, December 21.—N° 2969.

LEE, THOMAS VINCENT.—“A series of mechanical arrangements for performing the whole operation of making and burning bricks and tiles.”

1. Apparatus for mixing and moulding. The materials are thrown into hoppers, within each of which work three crushing rollers and two shafts fitted with arms or bars, which rise and fall to regulate the quantity of material admitted and to exclude large stones. From here they are conducted to vertical mixing cylinders, each of

which has blades fixed obliquely to its inner surface, and a rotating central shaft carrying other blades. Water is supplied to these cylinders by a stop-cock regulated by a "governor similar to those of the ordinary steam engine." The materials are next conveyed from the mixers to the moulding apparatus, through which it is carried by endless bands. The inventor's description of the moulding apparatus is, in the absence of drawings, indistinct. It is described as containing four rollers and two cylinders, and is calculated to mould six bricks at once, which bricks are moulded each on a moveable board, and are cut off by a knife, worked by means of a weighted lever.

2. "The application of hydro-caloric or the heat of surcharged steam to the burning or firing of articles manufactured from clay."

3. "The construction and arrangement of the coil" by which the steam is heated.

4. Improvements in the furnace to protect this coil from the direct action of the heat. The coil consists of an upper and a lower series of pipes fitted into a semicircular metal plate or box, and thus forming a vault of semicylindrical section immediately over the furnace, and running from back to front of the same. Between the furnace and the coil a screen of solid fire-clay is formed, and the heated air and smoke of the furnace is made to heat the pipes by being conducted along the space between this layer of fire-clay and a vault of brickwork which is thrown across above the coil.

[Printed, 34d. No drawings.]

A.D. 1853, December 24.—N° 2991.

HARDINGE, HARRIS.—An apparatus and process for dissolving quartz; and the application of liquid quartz to the manufacture, among other things, of blocks for building. The object of the process is to economise, by diminishing the quantity of solvents necessary to be employed in forming a solution of quartz, these solvents being costly. The apparatus consists of an iron covered pan fixed over a furnace, in which pulverized quartz mixed with water and a small quantity of such solvents as fluoric or boracic acid is kept constantly stirred up. A small coil of pipe is also provided in which steam, introduced from a boiler, is heated to a high temperature; this steam is thrown into the pan, and aids the formation of a solution. A series of condensers, cooled by water receive all steam thrown off from the boiler,

and as a portion of dissolved silica is carried off by that steam, the condensers as well as the pan are found to contain the required solution.

Pebbles and broken stone, with "argillaceous bases and scoria from iron furnaces" can be cemented together in moulds, with the solution to form blocks of artificial stone, and afterwards may either have their face ground or coated with liquid quartz. The application of the solution to artificial marble, furniture, varnish, coloured glass, &c. is claimed by the inventor.

[Printed, 11½d. Drawings.]

A.D. 1853, December 29.—Nº 3014.

JACKSON, HENRY.—"This invention has for its object a "peculiar combination of machinery for moulding bricks and "other articles of brick earth." The clay prepared in any suitable preparing machinery is received on to an incline, and passes between pressing rollers "to a series of endless straps of gutta "percha, or other suitable material, such straps carrying forward "the brick earth in divided sheets between guides. On the "sheets of brick earth arriving over a table or platform cutting "moulds descend, and each mould cuts out a quantity of brick "earth suitable for a brick or other article, depending on the "form of the mould." The top of each mould consists of a piston or plunger, having a spring behind it tending to force it to the mouth of the mould, so that the clay that has been cut out is compressed while in the mould; and further, "when the mould "rises the reaction of the spring forces out the moulded and "pressed articles."

The movement of the endless straps continually brings fresh brick earth over the table, and at the same time carries away the moulded articles to a balanced frame at the end of the machine, where an ordinary pallett being applied to each brick, and the frame caused to turn partly over, the moulded articles can be removed by hand. A modification of the stamping apparatus is described in which the discharge of the brick from the mould is effected not by the spring, but by a combination of levers.

Sand is sprinkled over the sheet of clay from a perforated vessel just before it arrives at the moulds.

[Printed, 1s. 1½d. Drawings.]

1854.

A.D. 1854, January 11.—N° 72.

TUSSAUD, FELIX.—A pump or press with continuous action, applicable to various purposes, among others, when acting as a press to brick-making.

The pump consists of a deep-threaded screw placed inside a cylinder, which it fits easily, and of an endless chain (or chains) entering and leaving the cylinder by openings near the top and bottom of the screw. Each link of this chain fits accurately the space between two threads of the screw, so that when the screw is worked the chain will be moving either up or down, and each link will act as a sucker or piston to draw along the spiral cavity between two blades of the screw, and either upwards or downwards according to the direction of working, any matters, liquid or pasty, presented at the end away from which the chain is travelling. Many modifications and applications of the principle are described as possible.

[Printed, 7d. Drawings.]

A.D. 1854, January 12.—N° 75.

WALLER, THOMAS.—*Provisional protection only.*—This “in-vention relates, firstly, to an improved construction of the back and sides of register and other stoves; and, secondly, to a peculiar form of tile or brick, affording a rule hinge joint applicable to such purposes.”

The improvement consists in having the sides of the stove moveable and hinged to the back, so that the space for fuel may be widened or narrowed at pleasure; tiles or bricks set in iron frames may be employed for back and sides, they are formed with “circular grooved edges to one set of tiles or brick, and circular ends or ribs to fit therein on another set;” and these, when applied to each other, together form the rule hinge joint desired. See Specification to Letters Patent granted to the same inventor A D. 1854, July 8, N° 1501.

[Printed, 3d.]

A.D. 1854, January 16.—N° 100.

BLAKER, PETER, and WOOD, WILLIAM.—*Provisional protection only.*—A machine for crushing coal and cinders for use in

rick-making and for other purposes. These substances "are crushed by being passed between metal rollers either with plain surfaces or indented, or revolving bars with projecting teeth, knives, or scarifiers, all or either, to which a rotary motion is given, either by human power, animal power, wind, water, steam, or any other at present known motive power."

[Printed, 3d. No drawings.]

A.D. 1854, January 27.—N° 206.

PALMER, WILLIAM.—Tubes or hollow blocks of earthenware or brick earth form the subject of this invention. They are intended to be employed in the construction of the walls, floors, and roofs of buildings. Those "for walls being made suitable for standing upright side by side, either in one or more rows;" they are open at the ends, and are, if needful, made with grooves, into which cement can be run for rendering the joints water-tight. Special forms for flues, door and window openings, roofs, and floors are described. In putting together, cylindrical tubes are employed that will fit into the cavity of the square ones, and the spandrels between the circular inner and square outer tubes are run with cement. The inner and outer tubes break joint for greater strength. Provision is made for wood fillets to which to nail floor boards, door frames, &c.

[Printed, 1s. 2d. Drawings.]

A.D. 1854, February 3.—N° 267.

FONTAINE MOREAU, PETER ARMAND le Comte de.—(*A communication.*)—This invention has for its object the rendering walls, &c. impervious to moisture, and consists of,—

1. "The combination of bitumen and sand for the production of a bituminous cement applicable to the construction or coating of walls and basins."

2. The application of the said cement to the construction of blocks or plates for facing to foundation or other walls; also to plates for affixing to bricks to give them an impervious face; such bricks to be laid in the cement. "For constructing canals, sewers, and cesspools," the patentee employs "blocks composed of

"broken brick, stones of all kinds, mixed with the said bituminous cement made in wooden moulds." The same cement is also to be employed in putting together these blocks.

[Printed, 3d. No drawings.]

A.D. 1854, February 16.—N^o 374.

SUMMERFIELD, THOMAS. — *Provisional protection only.*—Improvements in the materials, and also in the form of bricks.

1. Forming a coloured face to bricks. The bricks to be faced are first moulded in the usual way and of the ordinary materials, and then placed in a second mould a little deeper than the first, which difference in depth the inventor fills up "with a colouring compound consisting of the mixture usually employed in making glass," but altered or added to if needful. "The bricks thus made may be dried and burnt in the usual way."

2. "Making bricks wholly of a suitable compound so as to resemble marble or stone."

3. Making facing bricks, of whatever material, smaller at the back than at the front, so that the mortar joint will not go through to the face, but the front edges of the bricks will touch one another.

[Printed, 3d. No drawings.]

A.D. 1854, February 17.—N^o 386.

HOLT, ROBERT.—Machinery for making bricks and tiles. The inventor includes in his claim,—

1. "The peculiar arrangement or construction of the machinery or apparatus." The moulds in this arrangement are hollows on the surface of a drum placed with its axis horizontal. These moulds are to have moveable bottoms, those opposite each other being coupled by rods acting across the diameter of the drum, so that when any mould is filled the brick in the connected one on the other side is pressed out. Each mould is filled while vertical in position, and the clay is compressed by a plunger. When the mould becomes horizontal, a second plunger consolidates its contents by pressure, and on its reaching the lowest point of its revolution the brick is thrust out on to an endless band which removes it, by the action of the connecting rods, in consequence

of the mould opposite being filled. These movements are partly effected by a steam cylinder, partly by a large driving wheel acting through a crank upon a system of levers. The motion of the drum is not continuous.

2. Especially "the employment of a circular drum for the manufacture of bricks or tiles having sunken orifices or moulds, the bottoms of which are moveable, as required." This drum may be so manufactured as to contain oil or water to lubricate the works or the clay.

[Printed, 10d. Drawings.]

A.D. 1854, February 18.—N° 394.

BRITTEN BASHLEY.—1. Apparatus applicable to "crushing, pulverizing, and washing mineral earths or ores, and amalgamating the gold and silver contained therein, also to the grinding of earths, clays, and other materials for the manufacture of earthenware, porcelain, pottery, bricks, and cements." This apparatus consists of one or more pear-shaped crushers or pestles revolving in a pan, having a sunken circular space at the bottom with a raised centre, in fact, an annular channel, in which the lower extremity of the pestle or pestles works, so that the pestle shall revolve on its own axis, shall travel round the interior of the pan, and shall also have a slipping motion in consequence of its lower extremity slipping round in the channel. For gold collecting, mercury is admitted into the annular channel.

2. Apparatus for facilitating the collection of particles of gold or silver by their amalgamation with mercury.

[Printed, 7d. Drawings.]

A.D. 1854, March 4.—N° 525.

ROWLAND, ELLIS.—(*Provisional protection only.*)—Machinery for moulding bricks or tiles, from dry pulverized or disintegrated clay, but also applicable to clay or other materials in a plastic state.

Clay is fed into moulds, being recesses in a circular revolving table, and each mould in turn comes over a plunger, "which is caused to ascend with considerable and instantaneous pressure," due to "the upward stroke of a piston worked by the

" direct action of steam in a cylinder." The brick so consolidated is afterwards discharged by a further pressure from below imparted by any suitable means.

[Printed, 3d. No drawings.]

A.D. 1854, March 14.—N° 610.

CONNER, ALBERT WENTWORTH.—" This invention has for " its object improvements in machinery for moulding bricks, " where a chain or succession of moulds is used," the moulds being made of wrought sheet iron, coated with asphalte or bituminous matter. Each mould consists of only three sides, the fourth being supplied by the outer surface of one of the sides of the next mould. The metal is bent at the angles of the moulds into a kind of loop or cylinder which fits on to studs on an endless chain which carries them. One link of this chain forms the bottom of each mould, and the moulds are placed on the chain by hand, and carried by it with intermitting motion, first under a sand box, then through a hopper where they are charged with clay, and then under a compressing roller and a knife, which last smooths the upper face of the bricks and is kept moistened with water. The moulds, with bricks in them, are removed by hand, emptied, and returned to the other end of the machine to be replaced.

[Printed, 1s. 9d. Drawings.]

A.D. 1854, March 14.—N° 611.

SWAN, JOHN HOLLEY.—A kiln for " drying " bricks, tiles, " and other articles made of brick earth." The kiln consists of a long brick vault or tunnel, or two or more such vaults built side by side, each having a channel or flue, also in brick, under the floor, and a railway running from end to end. Furnaces are built near one end, and the smoke and heated air passes from them along the horizontal flue under the floor to a shaft or chimney at the other end, thereby heating the kiln. The bricks are ranged in trays placed on supports so as to leave a space between each tray and the one below it, and piled up on wheeled trucks of iron. In this way they are made to travel slowly along the railway from end to end of the kiln. There are doors at each end to keep in the heated air, and openings in the kiln to carry off such moisture as rises from the articles being dried.

[Printed, 6d. Drawings.]

A.D. 1854, March 15.—N° 619.

OATES, JOSEPH PIMLOTT.—Improvements in such machines for making bricks, tiles, pipes, and other articles as have “moveable “ boxes or dies open throughout,” into which a column of clay is forced; a portion of the invention being also applicable to brick-making machines of another character. The clay is prepared for use in a vertical chamber or pug mill furnished with a central shaft carrying screws near the top and bottom, and between them pug knives. The clay is next forced through a chamber, of which the upper opening is circular, but the lower opening of whatever form is most convenient to prepare the clay for delivery into the mould. Below this the mould or moulds slide, and the stream of clay passing through them enters a channel, which the inventor calls “an expanding and contracting rectum,” and the intention of which is to permit the escape of surplus clay and to keep up an equable pressure. The lower opening of the channel is consequently constricted by flaps or rollers on moveable bearings, or any other suitable contrivance capable of giving way under any excess of pressure. The filled mould is slid away and replaced by an empty one, the face of the brick being caused while being so slid away to “pass over a slot, by the edge of which slot the “face of the brick is planed and the surplus clay removed through “the slot.” Lastly, before the mould is drawn back a piston is caused to remove from it the brick, which is carried away on an endless band.

[Printed, 7d. Drawings.]

A.D. 1854, March 25.—N° 704.

BEAUMONT, GEORGE.—“Improvements in machinery or “apparatus for the manufacture of solid, hollow, and ornamental “bricks.”

1. Combining five or some other number of moulds in one casting, to be employed in producing several bricks by one operation.

2. Use of levers and compensating weights, to be worked by a treddle, and adapted either to lift the bricks out of the moulds, or, if preferred, to lift the moulds off of the bricks, leaving the bricks on a carriage for removal.

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3. Producing perforations, by cores fixed in the moulds if the perforations are to be made "the thick way of the moulded forms," or by rods or bars introduced into the mould and then again withdrawn if the perforations are to run lengthways.

4. Employment of carriages on which to mould and remove articles.

5. Employment of tramways on which the above-named carriages can run, to expedite the removal of the articles as they are moulded.

[Printed, 8d. Drawings.]

A.D. 1854, March 30.—N° 730.

COWLEY, HENRY.—*Provisional protection only.*—Improved machinery for the manufacture of bricks. The first portion of this machinery is a pug mill, cylindrical below, but with inclined sides above, which are fluted diagonally, and against which work "fluted diagonal rollers of a screw shape," rotating on their axes, and also revolving round a central shaft within the mill. From a receiving box below this pug-mill clay is pressed by a cylinder into the brick mould, a moveable stop being caused to retard the passage of the clay in the receiver, and so to occasion greater pressure of clay into the mould. When the latter is full, the stop will be withdrawn, the mould forced forward, and the brick ejected by a piston. Moveable plates will be made to fit in the bed under the moulds, and when moulded or perforated bricks are made, will receive the requisite dies or cores.

[Printed, 3d. No drawings.]

A.D. 1854, April 8.—N° 833.

SAVAGE, GEORGE.—*Provisional protection only.*—Various improvements in bricks and tiles.

1. Forming bricks with a recess at one end and projection at the other to joggle together when laid.

2. Rendering bricks impervious to moisture by dipping them in a boiling mixture composed of the resin of commerce, pitch, size, resin oil, common oil, two parts of each, with thirty parts of gas tar.

3. Forming pantiles with a ridge across that part of the tile which in drying is unsupported, and thereby strengthening them so that they shall not lose their original shape before or during burning.

4. Forming flat tiles, both for roofing and flooring, with perforations in the direction of their length, which render them lighter and less liable to distortion in the kiln than others.

[Printed, 3d. No drawings.]

A.D. 1854, April 11.—N° 843.

ROUND, ZACHARIAH.—This invention relates to the construction of bricks to be used in those “parts of buildings where an “attachment for nails, screws, and other fastenings is required, “being used (among other purposes) in substitution of the “blocks of wood usually built in,” and known as wood bricks; and consists in “the introduction or attachment of pieces of wood “or metal, or both, into or on bricks, for the purpose of affording “a convenient means of attaching to the walls into which the said “bricks are built such objects or matters as may be required to be “attached thereto.”

[Printed, 5d. Drawings.]

A.D. 1854, April 20.—N° 913.

JOHNSON, WILLIAM. — (*A communication from Magloire Augustin Jullienne.*)—A machine for moulding bricks or tiles from dry clay or brick earth by compression.

In this machine there is a strong horizontal frame of wood and iron fixed on legs, and forming a species of table which carries all the parts; and in this frame are two brick or tile moulds, open both at the top and bottom, and placed side by side, and two pistons to form the bottoms of these moulds; after the moulds have been filled and the surplus clay scraped off, their open tops are secured by covers and the pistons moved upward, exerting a pressure sufficient to consolidate the brick or tile; the covers being then removed, the pistons are caused to rise higher, and thus lift out the bricks ready for removal. Both the covers are attached to the lighter end of a lever; when they are brought down upon the mould, a catch under the other or weighted end of this lever holds them secure, so that on the catch being withdrawn, they will rise at once. The motion of the pistons is given by a long hand lever fixed on to an iron shaft running across the frame and moving in bearings at each end. Two shorter arms projecting from the same shaft have the lower ends of the piston

rods hung to them by links, and serve, when the lever is depressed, to drag the pistons upwards. The further elevation of the pistons to discharge the brick can be effected by a further depression of this lever; a second lever acting in a similar manner is, however, provided for this purpose, with a spring catch to keep the pistons elevated till the bricks have been removed. As soon as released the pistons fall by their own weight till arrested at the level of the lower end of the mould by an adjustable stop.

[Printed, 10*d.* Drawings.]

A.D. 1854, May 2.—N^o 980.

HUTTON, WILLIAM.—This invention consists in adapting to an ordinary pug mill a series of skeleton moulds for moulding bricks. Sloping channels are made in the bottom of the pug mill, each of which conducts to an opening permitting the clay to escape into a rectangular-shaped sloping conduit, at the end of which one of the brick moulds is applied. A knife is provided which can be caused to pass between the mouth of the conduit and the mould, and a moveable plate carrying a pad, to form a hollow in the side of the brick, closes the opening of the mould opposite the conduit. As long as the knife remains depressed, it, by bearing against a bell-crank lever, retains the plate and pad firmly in position; and when the attendant considers the mould to be filled, he works a lever, which by one motion successively causes the knife to sever the clay in the mould from that in the pug mill, and releases the pad. The mould with the brick in it can now be removed by hand, and a fresh mould introduced.

[Printed, 10*d.* Drawings.]

A.D. 1854, May 12.—N^o 1057.

WAITE, WILLIAM.—“The manufacture of blocks or pieces suitable for the construction of sewers, drains, or pipes,” to be either “in the form of lengths of pipe, segments of a circle, or other requisite shape,” and composed of irregular fragments of stone, or of gravel, sand, or other suitable material, made into a compact mass by being stirred up together, along with a bituminous cement in a state of fusion, “the same being lined or *inlaid* with zinc, glass, earthenware, or other suitable metal or *material*.” Also, “the strengthening of pipes so constructed,

“ or pipes made of any other material or materials, by means of
“ longitudinal wood sleepers, or strips of wood, laid under and
“ cemented to the same.”

[Printed, 3*d*. Drawing.]

A.D. 1854, June 20.—N^o 1354.

BYERLEY, GEORGE HENRY.—(*Letters Patent void for want of final specification.*)—Manufacturing hollow bricks, tiles, slabs, quarries, pipes, &c. from dry clay or brick earth, pulverized and intimately mixed with sand, ashes, or other approved substance by pressure. The clay is to be forced by the repeated strokes of a piston into chambers or tubes of the form required to produce the articles. In moulding hollow goods, rods or bars are to be supported within the mould to form the cavities, and the piston is to be formed with perforations for the rods to pass through.

[Printed, 3*d*. No drawings.]

A.D. 1854, June 22.—N^o 1369.

BLASHFIELD, JOHN MARRIOTT.—This invention consists of
“ the use of minerals or fossils containing phosphate of lime in
“ the manufacture of china, pottery, bricks, and other articles, of
“ which clay is the principal ingredient,” as a substitute for burnt bones. It is preferred that the fossils be washed in a perforated cylinder, revolving in a trough of flowing water, the interior and the axis of the cylinder being furnished with spikes or teeth. This process, if for fine pottery, is succeeded by the drying the fossils in an oven, or; if for ordinary purposes, by burning them in a kiln. For the finest pottery the best fossils are to be selected, and after being washed, as above described, are to be cleaned by having a strong jet of high-pressure steam thrown upon them. The fossils, in whichever way prepared, are subsequently ground to a more or less fine powder; and if particles of iron are present, the powder is passed over the poles of an electro-magnet. This material is used alone, or along with other ingredients, for forming a plastic composition.

The details of manufacture may be varied. The advantage attributed to the employment of minerals or fossils is, that the goods are thereby rendered less liable to warp in the kiln than when otherwise prepared.

[Printed, 4*d*. No drawings.]

A.D. 1854, June 22.—N° 1379.

FARRELL, ISAAC.—The manufacture and use (for floors, roofs, walls, bridges, and girders) of tiles or slabs designed to obtain mutual support when fixed. Each tile has a “rabbated button,” which “may be round or square, or any other geometrical figure,” raised on or attached to the middle of it at the back, and has its four corners so cut off and rebated, that each is equal in size and form to one-fourth of the button; and the tiles are to be so laid, that the angles of four in an upper series shall exactly receive the button in the centre of one in a lower series. There are indents on the backs of the tiles to admit of a bed of mortar.

Several varieties of form are shown and described by the inventor, who proposes to build walls and bridges of these tiles laid edgewise; also a compound beam formed of two thicknesses of slate slabs, “with a wedge-shaped button bolted to the centre of “each,” and the ends of the slabs cut obliquely, so as to correspond with and embrace the splay of the wedge. All the bolts pass through an iron plate, or two iron plates, placed between the slabs of slate.

[Printed, 1s. 1d. Drawings.]

A.D. 1854, July 8.—N° 1501.

WALLER, THOMAS.—“Improvements in the construction of “stoves and other fire-places.” These improvements consist in lining the back of a stove or fire-place with a single fixed tile, having a bead on each edge, while each of the two sides is lined by a moveable tile, having a hollow on one edge so made as to form with one of the beads of the fixed tile a hinge, which allows the width of the fire opening to be contracted or enlarged at pleasure. Iron plates or frames may be added to strengthen or steady the moveable cheeks; and face plates, which can entirely close up the grate, may be used in combination with them. See Provisional Specification A.D. 1854, January 12, N° 75.

[Printed, 5d. Drawings.]

A.D. 1854, July 15.—N° 1560.

SUMMERFIELD, THOMAS.—*Provisional protection only.*—This invention is the same which formed the subject of the Pro-

visional Specification of the same inventor, dated 16th February 1854, N° 374, of which an abstract has already been given.

[Printed, 3d. No drawings.]

A.D. 1854, July 21.—N° 1604.

KNIGHT, JOHN, and STUBBS, JAMES.—This invention includes,—1. "The use of steam or water in the cylinders or piston boxes of brick machines and other machines for fashioning clay and other plastic materials." This steam or water is forced into the machine with a view to aid the lubrication of the clay. The same can be also done with pug mills.

2. Adding a second die or mouthpiece beyond the usual vent of such moulding machines as express a continuous stream of moulded clay. This die may be hollow, and steam may be thrown into it, or any desired coating may be laid upon the clay by means of it, or if patterns are impressed upon already moulded clay, this die may be used to fill up the impression with colour.

3. Impressing devices on bricks, tiles, &c., by means of rollers.

4. Fixing cores in the dies of brick machines.

5. Using similar machines for artificial fuel.

6. Two mechanical improvements in brick-machines. The one consisting in communicating motion through a "friction sheave," so that if the working of the machine be checked through any obstacle getting into it, the friction sheave will yield, and damage will be avoided. The other improvement consisting in "giving motion to the pistons of brick machines by means of a rocking shaft." This shaft carries two arms; one of them receives a reciprocating motion from a vertical wheel by means of a lever acting like a crank, and the other arm conveys the motion to the pistons.

[Printed, 6d. Drawings.]

A.D. 1854, August 10.—N° 1751.

UREN, EDWARD WILLS.—*Provisional protection only.*—This invention consists in a new or improved arrangement of machinery for making bricks, tiles, &c. The nucleus of the machine is a "cylinder or other shaped hopper," fixed upright, and having a main vertical shaft passing through it. *Rotary motion is communicated to this shaft, which carries pugging*

knives within the hopper, and also driving wheels and cogged gearing to actuate the different parts of the machine.

By these means motion is communicated to "a wheel for hauling up the clay for supplying the machine," and to conical rollers at the top of the cylinder for crushing and pugging the clay. At the bottom of the cylinder are two sets of rollers and scrapers for consolidating the clay into the moulds. Rotary tables, fixed below the cylinder, carry the moulds, which moulds have false bottoms, and after being filled are, by the rotation of their tables, carried over inclined planes to force the bottom of the mould upward, and thus eject the moulded article. Sanding boxes are provided. The machine is mounted on wheels to render it locomotive.

[Printed, 3d. No drawings.]

A.D. 1854, August 21.—N° 1835.

SMITH, WILLIAM HENRY, BESSEMER, HENRY, and LONGSDON, ROBERT.—Improvements in the manufacture of numerous articles, including tiles, slabs, blocks, &c., from the vitrified substances or slags produced in the process of smelting iron and other metals, which improvements consist,—

1. "In the mode of conveying the fluid slag from the furnace through gutters or channels into clay vessels kept heated in a suitable furnace."

2. "In casting various articles of slag in moulds formed of sand, loam, plaster of Paris, and stone, and in moulds formed partly of sand and partly of iron; in an apparatus for forming ornamental designs in sand for the above purposes; and also in moulding or rolling small tessalæ or other articles by revolving moulds." When manufacturing ornamental tiles the inventors give to the surface a sunken pattern, which is to be subsequently filled in with any suitable coloured glass, enamel, or other materials in powder before burning. Ornaments are produced on tiles moulded in sand by causing a roller having the required ornaments in relief on its surface to pass over the sand mould, and thus impress the pattern on it.

3. Apparatus for rolling flat plates of slag.

4. Ovens for annealing articles made of slag, and the treat-

ment of the same by processes suitable to the kind of article to be annealed.

5. Grinding and polishing articles made from slag, and improving the appearance of some articles by removing their surface by the action of fluoric acid.

[Printed, 3s. 2d. Drawings.]

A.D. 1854, September 2.—N° 1918.

FINLAY, WILLIAM. — *Provisional protection only.* — Machinery for the manufacture of bricks and tiles by compression. In this machine a piston or plunger works to and fro in a chamber fixed horizontally, and the clay for a brick being introduced into the chamber, and the mouth of the chamber closed, the plunger comes forward and forcibly compresses the clay so as to form a brick. The open end of the chamber is closed by a “revolving door,” consisting of “four pallets fitted or cast on to a central base, through which is passed the axis of the door.” Each pallet, when brought vertical, fills up the end of the chamber, and is held in its place by a catch on the lid or top of the chamber, which lid is moveable, but is held down securely while the brick is being compressed. After the brick is moulded the lid rises, releasing the pallet, and the “revolving door” then makes a quarter revolution, carrying away the moulded brick, and bringing up a fresh pallet into a vertical position ready for the return of the piston, driving a fresh lump of clay before it to form a fresh brick.

[Printed, 3d.]

A.D. 1854, September 21.—N° 2041.

HODSON, WILLIAM. — Improvements in machinery for forming bricks, tiles, &c. by expressing clay through a moulding orifice.

The clay is delivered by an ordinary pug mill into a chamber. “Within this chamber a screw is caused to rotate, fixed on a horizontal axis at the back of the moulding orifice, so as to express or force out the clay or brick earth in a continuous stream through the mould by a direct horizontal pressure.”

The mould has double sides, the space between outer and inner

mould being kept full of water. The inner surface of the mould is worked into channels, with holes communicating between them and the water-space. Inside the channels is a lining of cross-grained wood, and this in turn is lined with fustian or similar material, so that the water can saturate the whole inner surface of the mould. The stream of clay is cut to the required lengths by a wire, and received on to a pallet fixed to a rising and falling frame, which frame is provided with a balance-weight.

[Printed, 1s. 2d. Drawings.]

A.D. 1854, September 30.—N^o 2101.

COLLINS, THOMAS.—This invention consists in improvements in the manufacture of bricks and tiles by constructing drying sheds in connexion with the kilns, and employing the surplus heat thrown off by the kiln during the burning of the bricks, &c. for drying the moist moulded articles in the drying sheds, thereby effecting a saving of fuel.

The kiln is vaulted in brickwork with a double vault, and the drying sheds are ranged in parallel rows, with one end abutting on to the kiln. They have a perforated floor resting upon a range of arched air chambers also perforated. The hot air and smoke of the kiln ascend into the space between the two shells of its double vault, and are conducted from there to a tall chimney by a series of iron pipes running along the perforated air chambers under the shed (one to each chamber); the heated surface of these pipes warms the air in the chambers, and causes it to ascend into the drying shed. When the kiln has ceased to smoke, the hot air passing from it is conducted directly into the perforated air chambers. A distinct current of hot air is passed through the drying shed itself to carry off vapour, the whole being regulated by suitably placed dampers, which the workman can open or shut as he finds requisite.

[Printed, 10d. Drawings.]

A.D. 1854, October 7.—N^o 2154.

UREN, ROBERT WAY.—Machinery for brick-making, and adapted to the production of bricks, &c. in considerable numbers. The patentee states that his "invention consists in constructing machinery for the manufacture of bricks, tiles, and other like articles from clay and other plastic materials by the employ-

“ ment of cylinders or chambers provided with pugging knives
 “ and pressing bars, in combination with connected sets of
 “ moulds, caused to move to and fro beneath the said cylinders
 “ or chambers, so as to be filled therefrom, and then discharge
 “ the moulded articles on to suitably disposed receiving tables.
 “ The cylinders or chambers may be arranged in pairs, one
 “ cylinder of each pair being placed on one side of the centre of
 “ the machine, and the other cylinder of each pair being placed
 “ on the opposite side, and the sets of moulds in connection with
 “ such pairs of cylinders or chambers may be so worked as to
 “ move together, the one set being filled while the other set is
 “ being discharged; or the cylinders or chambers may be otherwise
 “ arranged, and the moulds in connection therewith may be
 “ worked independently. The receiving tables also may be con-
 “ structed so as to have a rotary motion, or they may have a to-
 “ and-fro motion for the purpose of presenting fresh portions of
 “ their surface to receive the bricks and tiles as they are discharged
 “ from the moulds.”

The claim of the patentee comprises,—1. The construction of machinery employing cylinders “provided with pugging knives
 “ and pressing bars, in combination with connected sets of
 “ moulds caused to move to and fro beneath” them.

2. The mode of arranging the cylinders in pairs as described, and of “causing the moulds to move to and fro beneath such pairs of
 “ cylinders.” The movements are all communicated by one central and vertical shaft, which, beside carrying at its upper end a cogged wheel that drives the shafts of all the cylinders, carries lower down a cogged segment. Each opposite pair of mould frames is connected together by a pair of iron rods passing one on each side the centre shaft and partially cogged, so that the segment can gear for a short time into each rod alternately, and thus move the moulds alternately to and fro.

3. A reciprocating motion for mould frames not in pairs. The mould-frame shaft, in this instance, carries a single cogged rod gearing into two toothed pinions, one on each side of it, and motion is communicated alternately to these two by a segment similar to the one above described and carried by the central shaft.

4. Constructing cylinders with a false bottom, between which and the true bottom the frames with moulds traverse.

5. "Employment of pressing bars in cylinders or chambers," fixed in an inclined position, and acting partly to press clay into the moulds and partly to separate the clay in the moulds from the clay above in the cylinder.

6. "The combination of several moulds in one frame."

7. "The modes of constructing and working the receiving "tables" described in the Specification. Some of these tables are fixed on a pivot, and perform a quarter revolution between each discharge of bricks; others have a lateral movement to and fro. The mould frame of filled moulds is disconnected from the shafts by means of which it is actuated after each traverse of such shafts, and is removed on the table, and replaced by a frame of empty moulds, which is brought up upon the table.

Slides cover the openings in the false bottoms of cylinders during the time that the mould frames are withdrawn. A platform for materials, with a separate shoot for each cylinder, is erected over the machine.

[Printed, 1s. 4d. Drawings.]

A.D. 1854, October 19.—N^o 2238.

PLATT, JOHN.—"Improvements in machinery or apparatus for "making bricks."

1. An improvement applicable to brick machines when a series of travelling moulds are employed, and consisting in apparatus allowing a sufficient quantity of clay to be supplied for filling them, and then closing the orifice till the moulds are ready for another supply. Hoppers, with a valve directing the supply alternately to two different points, and self-acting slides to open and close the mouths of them as required, are shown on the drawings, but other methods may be employed.

2. An improvement applicable to the machine for which Letters Patent were granted to James McHenry, A.D. 1852, July 20, N^o 14,234, and consisting in "the use of suitable apparatus for "positively drawing down the pistons within the moulds," to restore them to their position after the contents of the moulds have been expelled. The piston rods are formed with T-ends, which pass as they travel into grooves in the parallel lever used for discharging bricks, or are formed with grooves to pass on to projections on the lever. In either case the lever, when caused to descend, will draw down the pistons after it.

3. "Sweeping off the pressed bricks by means of an apparatus which arrives in contact with one portion of the range at a time," the apparatus being a rail with its face formed in steps instead of parallel to its back.

[Printed, 10d. Drawings.]

A.D. 1854, October 26.—N° 2283.

ECCLES, JOSEPH.—The inventor describes his invention as an "arrangement and mode of constructing mould boxes" suitably "for the manufacture of bricks with hollows in them, when used in machines which form or mould such bricks from dry or untempered clay or materials by compression," and specially applicable to the machine described in the Specification of Letters Patent granted to James McHenry, A.D. 1852, July 20, N° 14,234. One or more hollow plugs of a wedge form are fixed to the bottom of each mould, and may extend to its top if wished. They form the hollows in the brick, and, being themselves perforated at the narrow end, afford an outlet for compressed air. A piston plate, having openings in it which exactly fit the widest part of the plugs, lies over the bottom of the mould, and when raised from below expels the brick easily.

[Printed, 8d. Drawings.]

A.D. 1854, November 16.—N° 2431.

PLATT, JOHN.—Improvements applicable to the machinery for brickmaking, for which Letters Patent were granted to James McHenry, A.D. 1852, July 20, N° 14,234, "or to other machines in which a roller is employed for pressing the material into moulds, from which the bricks are discharged by the action of pistons."

1. "The application of loose bottoms to the moulds, capable of being raised and pushed off with the pressed bricks, whether such loose parts be flat for producing solid bricks, or provided with projections for forming hollow bricks." These loose bottoms or pallets are applied by being laid in a series of open frames, corresponding accurately with the brick moulds, and fixed at the back of the rail which sweeps off the moulded bricks, so that they shall be brought over the emptied moulds, and then drop out of the frame on to the descending pistons.

2. "Constructing the pistons forming the bottoms of the moulds with projecting parts, which will form hollows, extend-

“ing to the outside of the brick at one or both ends thereof,” so that the moulded brick can still be removed laterally by the rail.

3. Forming the mould with a fixed core, secured at the back, the piston being formed with a perforation exactly fitting this core, thus allowing the bricks to be moulded hollow, and yet be discharged in the usual manner. A mode of making the bottom of the mould in two independent portions is referred to in the Provisional Specification, but not claimed.

[Printed, 8d. Drawings.]

A.D. 1854, November 22.—N^o 2468.

GIBSON, CHARLES.—*Provisional protection only.*—Machinery for moulding bricks, tiles, and drain pipes. The moulds are mounted “in a frame, either circular or rectangular, and caused to move alternately under the hopper or clay box,” there “to receive the clay to be moulded, and under a descending piston or plunger, by which the moulded articles are discharged on to a traversing endless band.” Cores are added for making hollow goods.

[Printed, 3d. No drawings.]

A.D. 1854, November 24.—N^o 2483.

CUNLIFFE, RILEY.—A machine for moulding bricks and tiles by direct pressure from a steam cylinder or engine.

The beam of a steam engine works above the machine, and communicates motion directly to a presser connected with it by a vertical rod, and, through cranks, to a “ram” acting horizontally. Each stroke of the ram moves forward a portion of clay on to a set of moulds, and the presser, subsequently descending, drives it into them with great force, and thus moulds the bricks; at the same moment the contents of a corresponding set of moulds, which had been filled at the previous stroke, are expelled. The two sets of moulds are fixed in one frame, and have moveable bottoms so connected to the two ends of a lever working below the mould frame, that forcing down the bottoms of one set raises those of the other set. This frame has a horizontal reciprocating movement across the machine, so as to discharge bricks at either side alternately. This motion is communicated from a toothed pinion or segment which works in a rack fixed to the mould frame.

The shaft carrying this pinion or segment gets the requisite intermitting and alternating motion through a connecting rod fixed to the main driving beam, and the end of which is alternately held and released by spring catches fixed in a metal plate, which plate is keyed on to the end of the shaft. This motion can be best understood from the drawings.

By preventing the presser from acting and employing the ram only, with the addition of proper moulds fixed vertically, and a roller table and a wire cutter, this machine can be made to produce drain tiles or hollow bricks.

[Printed, 8d. Drawings.]

A.D. 1854, December 23.—N° 2713.

WALKER, JAMES.—*Provisional protection only*.—This “invention consists in the direct application of the elastic force of steam for the purpose of dislodging plastic clay from the receiving chambers of pug mills employed in preparing and forcing plastic clay into and through dies for the purpose of forming it into bricks,” &c. Also employing for the same purposes steam acting alternately on both sides of a piston.”

[Printed, 3d. No drawings.]

A.D. 1854, December 23.—N° 2714.

PORTER, JOHN FRANCIS.—Letters Patent having been already granted to this Inventor (A.D. 1853, October 11, N° 2336) for “a form of machine suitable for moulding bricks, &c., by the compressive power of a pair of rollers immediately over a mould or moulds,” he in the present Specification describes “a more convenient arrangement of machinery,” and other improvements for the same purpose, the clay being dry or nearly so. He claims,—

1. The combination of the machine.

2. The mode of moving the table. The moulds into which clay is fed by the rollers are contained in a horizontal, circular table, having an intermitting rotary motion. To communicate this a cam is caused to revolve with the rollers, and at each revolution gradually to raise and then to liberate a vertical rod, to which a weight is attached. By a suitable arrangement of gearing and a ratchet coupling box, this rod moves the table rapidly round far enough to bring a fresh mould under the rollers; the object sought to be

attained being rapidity of motion, "and at the same time to " diminish the risk of accidents, by a more impulsive mode of " giving motion."

3. "The arrangement of lubricating apparatus." The clay passes from the rollers to the mould through a gun-metal chamber, and a channel runs round the interior of this chamber, to be filled with cotton and supplied with oil or other lubricating fluid.

4. "The mode of inserting the scrapers in the mouthpiece or " chamber." One pair of these is fixed at the top of this chamber in contact with the rollers, to detach the clay from them, and others at its mouth serve to remove the superfluous clay from the moulded bricks.

5. The contrivances connected with the moveable pistons forming the bottom of each mould. To form an indentation in one face of the brick a separate piston inside the other is employed, which may be withdrawn before the brick is ejected. Below each piston a friction roller is attached, running on a circular rail below the table, which rail, at the point where it is wished the bricks should be ejected, is fixed on an incline, so that the roller travelling along it forces the piston upwards.

6. The combination of a "cylindrical polygonal mould frame " turning on its axis," and having a scraper to traverse across the surface of each mould when filled, "with rollers for filling the " mould and compressing the clay within the same."

An apparatus is described as capable of being combined with the machine "for severing bricks from an issuing supply of clay " "without stopping the machine." Here a pallet board, and a frame carrying it, are pushed forward by the clay till, on arriving at the proper point, they touch a bolt and release a spring catch, which allows the wire to make a cut. The frame and pallet are quickly drawn back towards the die as each brick is cut off by the falling of a weight which in their advance they had gradually raised.

[Printed, 10d. Drawings.]

1855.

A.D. 1855, January 2.—N° 9.

ARNOLD, JOSEPH.—“A new mode of ornamenting bricks and “other moulded articles for building purposes.” Patterns sunk or in relief can by this mode be formed on one or more of the faces of the bricks or blocks, during the process of moulding.

The mould employed is similar to the ordinary brickmaker's hand mould, but with one side moveable, and secured to its place by screws or spring catches. The die for the pattern is engraved on this moveable side, and after the brick has been carefully moulded in the usual way, is drawn back, so as to come away from the impressed ornament previously to the mould being lifted off. When more convenient, the pattern die may be formed on a board that will serve as bottom to the mould.

[Printed, 10d. Drawings.]

A.D. 1855, January 18.—N° 137.

PIDDING, WILLIAM.—*Provisional protection only.*—This invention is for the manufacture of composite building materials from sundry hard substances “in various proportions,” cemented together under great pressure “with a well-known siliceous cement “formed of pulverized silica dissolved in a digester in a strong or “highly-concentrated solution of alkali rendered caustic with lime “under very great pressure.”

Also the manufacture of pipes from pieces of slate bolted together.

[Printed, 8d. No drawings.]

A.D. 1855, January 19.—N° 149.

HILL, THOMAS COËNDOZ.—An improvement in the mode of forming the junctions of drain pipes and tiles, so as to secure a good joint, combined with a facility for removing any pipe at pleasure. “These advantages,” says the patentee, “I secure by “forming or cutting off the ends of the pipe or tile at an angle, “by preference of 45°, but of any other angle than a right angle.

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"When two lengths of pipe so formed are laid together, they form a scarf joint." No flanges or sockets are shown on the drawings.

[Printed, 8d. Drawings.]

A.D. 1855, January 24.—N° 181.

TUPPER, CHARLES WILLIAM.—This invention relates to a method of constructing, and employing as a covering for the sides and roofs of buildings, tiles of galvanized iron or other suitable material. The two edges or sides of each tile are to be turned up longitudinally into a sort of "tubular beading of any suitable section," rather smaller at one edge than the other, "so as to allow the beading of two or more similarly-formed tiles to be slid into or over each other, forming thereby a species of telescopic joint." Each tile is fastened to the batten by one or more pins or nails, and has on its under side and near its lower edge "two or more lugs or pins, which would fit on the edge of the previously laid tile, and the upper and lower edges of the tiles may be bevelled or bent slightly to afford space for the heads of the holding nails or pins, and so prevent the water from finding its way underneath the tiles by capillary attraction." The invention also includes a ridge piece having hollow beads fixed at intervals transversely to its length, into which the beading or rolls already described can be fitted.

[Printed, 8d. Drawings.]

A.D. 1855, January 31.—N° 240.

PORTER, JOHN FRANCIS.—This "invention consists, first, in the combination of a pug mill with a pair of rollers for expressing clay through dies or into moulds for forming bricks," so that "the power expended on pugging the clay is made available to a great degree for forming the brick."

2. The pug mill, which is fixed horizontally, "is constructed with two or more revolving shafts parallel to each other or at an angle with each other, upon which inclined blades are affixed."

3. Constructing expressing dies of metals that differ in their degree of smoothness of surface, the angles being of gun metal or brass, and the sides of iron, in order that "those parts of the

“ moulds which, from their shape, offer a greater resistance to the “ passage of the clay or earth may be rendered less adhesive,” and also fixing a stop to impede the passage of clay through the centre of the orifice, for the purpose of equalizing resistance.

Beside the above, the inventor lays claim to constructing shafts with blades cast or fixed on to them, and having a core through their centre for the insertion of a spindle; forming with moveable plates a pyramidal shaped feeding chamber fixed between the pug mill and the rollers; and the insertion of scrapers between the rollers and die in the position shown on the drawing.

[Printed, 10d. Drawings.]

A.D. 1855, February 6.—N° 284.

GRAINGER, JOHN.—“ This invention consists of forcing clay “ or brick earth through dies formed with openings corresponding “ with the transverse sections of the sizes of pantiles to be made, “ by which means a continuous sheet is obtained, the transverse “ section and longitudinal contour or bend of which correspond “ with those of the intended pantiles. A sheet of clay as it “ comes from a die is received on to a saddle or surface corre- “ sponding to the contour of the tile, on which surface it is cut “ into the lengths desired, and also at the angles, and the neb to “ each tile is made by hand.”

[Printed, 8d. Drawings.]

A.D. 1855, February 16.—N° 350.

PERCY, WILLIAM CARTER STAFFORD, and CRAVEN, WILLIAM.—This invention includes various “ improvements in the “ manufacture and the machinery and apparatus used in the “ manufacture of bricks, tiles, pipes, and other articles made from “ plastic materials.”

1. The invention, firstly, relates to “ a mode of tempering clay “ or other similarly plastic materials, and consists in the appli- “ cation of steam for the purpose of moistening or saturating the “ plastic material.” The apparatus for this purpose consists of a box with a door at top and bottom, and containing several sieves one below another; the clay is thrown on to the top sieve, a jet of steam is admitted, and the clay, as it is tempered, will drop

through the various sieves, and can be removed at the bottom of the box.

2. Pugging machinery; the pug-mill being vertical, and its sides pierced full of small holes, so that the clay being constantly pressed outwards and downwards by blades suitably formed, is forced through the sides of the pug mill and collected on a wide flange or dish encircling the base of the mill; while the refuse only is discharged through two large openings in the bottom plate of the pug mill.

3. Moulding machinery. The prepared clay is in this machine fed by the help of rollers into the moulds, of which there are one or more pairs travelling to and fro, actuated by a crank motion. The moulds have moveable pistons to close them below, and each one, after being allowed to remain stationary while filled, passes between a fixed metal plate and an inclined plane, so that the piston is forced upwards and compresses the clay in the mould. This inclined plane is itself the long arm of a lever, and when the brick mould passes from under the metal plate, a portion of the mould frame depressing the short arm of this lever causes the other one to rise and, acting on the mould piston, to eject the brick.

4. A "mode and mechanism for drying articles moulded from plastic materials;" this is accomplished by causing the articles to travel from end to end of a "pipe or channel, into which a current or draught of air is caused to enter at each end by means of a centrifugal fan communicating with the middle of the pipe or channel," so that the air may act first upon one side then upon the other side of each article. The articles are caused to travel on boards pushed forward along an endless web sustained by rollers, with a similar arrangement for the return of the empty boards. A system of levers is described and shown by which the boards can be raised from the lower or return way to the upper.

5. An arrangement for lubricating the sides of chambers through which clay has to pass. These chambers are to be lined with porous wood, "placed with its grain perpendicular to the sides of the boxes or chambers, channels being cut at the back," and "kept filled with water, which filters through the pores of the casing," moistening its entire face.

6. A mode of manufacturing hollow bricks, tiles, &c., by

moulding them near the size and shape required, and, after partially drying, subjecting them to pressure in dies and moulds for giving the hollow and the exact external form. Also consolidating solid articles in the same way. Also the mechanism by which this work is effected. This machine is intended to be worked by hand; it has a table to hold the moulds, arranged so that it can be revolved to bring each in turn under the pressing apparatus; pressure is applied first from above by a piston, which enters the top of the mould, and then from below by the bottom of the mould being forced upwards through the action upon it of a powerful lever. Where the articles are hollow the upper piston contains the die or dies, and after its face plate has reached the top of the article the die is protruded from that plate, entering the clay to the required depth. After the pressure has been applied, the further revolution of the table carries the mould over an inclined plane, which, acting on its moveable bottom, expels the brick.

[Printed, 1s. 6d. Drawings.]

A.D. 1855, February 16.—N° 355.

WRIGHT, SAMUEL BARLOW, and GREEN, HENRY THOMAS.
—Improvements in the manufacture of encaustic tiles. “This invention consists of causing clay to be expressed through a suitable die (in the form of a sheet, as has heretofore been practised in the manufacture of other tiles), which is received on a tray or surface as it moves past the expressing machine, such tray having sides of vulcanized india-rubber moving at like speed,” and being made of separate boards, on which the tiles, when they leave the machine, can be carried away. The sheet of clay passes under a roller that embosses on its surface any desired pattern, and the indentations so produced are filled “by passing the printed sheet under a trough containing clay of a color different from the body of the sheet.”

Subsequently the sheet is cut into tiles, which, when dry, are scraped and burnished by the action of revolving scrapers and revolving burnishers, and after being made true, and square, and slightly undercut at the edges by a grinding surface, are finished in the ordinary manner.

[Printed, 1s. Drawings.]

A.D. 1855, February 21.—N° 388.

NOBLE, GEORGE.—“This invention consists of a combination of hydraulic machinery for pressing clay in a pulverized state, “with or without a slight addition of water,” for the purpose of manufacturing fire-bricks. In this machine there is a horizontal iron plate, free to travel to and fro, and carrying two metal boxes, into which two brick moulds are fitted; below each mould is a presser, forming the bottom of the mould, and which can rise and fall.

When the machine is at work each mould in turn is first carried under a hopper, from which it is filled with pulverized clay, next passes under a strong plate of metal, which forms a top to the mould, while a hydraulic ram, exercising an upward pressure, elevates the presser already described, and consolidates the brick, and lastly is moved from under the iron plate and caused to pass at the same time over an inclined plane, which, acting from beneath upon the moveable presser, forces it further up into the mould, and so ejects the brick. To assist in the removal of the brick the moulds are constructed with their sides distinct and moveable, and they and the frames are so formed that when the mould is drawn downwards its sides and ends recede from one another. This is caused to take place just as the presser is rising to expel the brick, and the pair of moulds are so connected, by a lever, that the one about to be filled is wedged up into its frame and contracted to its proper size by the same motion that draws down the one about to be emptied. The combination described and shown in the Specification and drawings, whereby “hydraulic apparatus is employed for moving the moulds as well as for “affording the requisite pressure,” forms a distinctive feature of the invention. Beside the compressing ram there are two cylinders for effecting the reciprocating movement of the plate, and another one to act as a regulator, and to work the water-cocks.

[Printed, 1s. 4d. Drawings.]

A.D. 1855, March 3.—N° 470.

VABRE, ANDRÉ BERNARD.—(*A communication.*)—*Provisional protection only.*—A method of constructing fire-proof floors, of a series of flat arches composed of hollow pieces of pottery, made either

from ordinary or fire-clay, and of a slightly wedge-shaped form. These arches are to spring from proper skew-backs of the same material, supported on wrought-iron girders, placed at short distances apart.

[Printed, 8d. No drawings.]

A.D. 1855, March 9.—N^o 533.

HILL, THOMAS.—*Provisional protection only*.—Machinery for brick-making, intended to convey clay from a pug mill into the moulds. The nature of this invention is defined as “the
“ delivering of clay or other plastic material into moulds, dies,
“ and the like, by means of a drum, in which plungers are
“ so fitted as to protrude from and recede into the drum at such
“ intervals as are necessary for the taking up of the clay and
“ delivering it into the moulds.”

[Printed, 8d. No drawings.]

A.D. 1855, March 22.—N^o 638.

CARNELL, CHARLES.—*Letters Patent void for want of final Specification*.—Self-acting machinery for moulding bricks. A pug mill, from which the clay is discharged into a filling box, forms part of this machinery. The moulds are slidden under this filling box, and then the clay is pressed out from it into them by the descent of a piston. After the moulds have been filled, they are discharged on to a carriage, by which they are removed. To prevent breakage in consequence of any obstruction to the movement of the moulds, they are pressed forward by a hinged arm, kept in position by a friction break, but capable of yielding to such an amount of undue pressure as would overcome the force of the break.

“ The moulds are constructed with a moveable bottom, so
“ arranged that it admits of being separated from the frame of
“ the mould. When the moulds are filled and discharged from
“ the machine, they are severally turned over, and the bottom
“ being raised, permits the air to enter, and thus facilitates the
“ discharge of the bricks from the moulds.”

[Printed, 8d. No drawings.]

A.D. 1855, March 28.—N° 685.

HUTCHISON, WILLIAM.—This invention is described by the patentee as “the manufacture of artificial stone of any desirable colour by incorporating sand, loam, chalk, gravel, shingle, plaster, cements, lime, or other similar loose and friable substances with tar, resin, or other suitable bituminous or resinous substance, and by compressing the compound mass in moulds.”

[Printed, 3d. No drawings.]

A.D. 1855, April 3.—N° 750.

EVARD, MAXIMILIEN.—“A machine applicable for pressing and moulding bricks, plastic and ceramic and other materials.” This machine “consists of a plunger made to work to and fro by steam or other power, or by hand labour, in a cylinder, in the upper part of which is an aperture through which the materials to be pressed are fed; the mouth of the cylinder opens into a tubular or other shaped mould, into which the materials are forced. A weighted cover may be used for the mould, which may be made to press more or less upon the materials passing through it, when the resistance to their passage may be increased, and they may consequently be more compressed,” “the degree of pressure imparted to the materials under treatment being regulated by the mount of friction at the part where they are discharged from the mould. At every back stroke of the plunger it is drawn clear of the feed aperture, and drives a fresh supply into the mould at every forward stroke.”

[Printed, 7d. Drawings.]

A.D. 1855, April 27.—N° 952.

MULLER, EMILE, GILARDONI, JOSEPH, and GILARDONI, XAVIER.—This invention consists of,—1. A flat roofing tile, to be made of considerable size, with a strengthening rib on the face, and groovings and clampings at the top, bottom, and sides to exclude moisture, and holdfasts by which the tiles are to be secured to the lath with copper wires. The exact form of this tile can be best seen on the drawing.

2. Machinery for the manufacture of such tiles continuously, and *consisting either in a stamping press, under which arrive plates of*

clay in continual succession to be moulded, or in two cylinders containing the moulds and producing continuously. In either case the moulds are to be heated by steam, or otherwise, to obviate adhesion of the material.

3. "A conterminous succession of furnaces" for burning such tiles, the surplus heat of one being utilised in gradually heating another.

[Printed, 6d. Drawings.]

A.D. 1855, May 8.—N^o. 1031.

BOWRON, JAMES.—"The manufacture of glass tiles by pressing them to the required shape and size from fluid glass, instead of the customary mode of first making the glass into sheets, and then cutting and bending to the desired shape."

The mould is proposed to be of two parts, the lower portion being of the exact shape required to mould the shape of the under side of the tile, and the upper being a metal frame connected by a hinge with the under, and of such a shape as to define the edges of the tile. Molten glass being ladled into this mould, is pressed down by a plunger, which just fits the frame, and of which the face will give the contour required for the upper part of the tile. When this is withdrawn, the hinged frame is raised, and the tile slid off from the under mould, and conveyed to a proper oven to be annealed.

[Printed, 3d.]

A.D. 1855, May 12.—N^o 1069.

SANDERS, FREDERICK GEORGE.—An improvement in brick, pipe, and tile machines, the nature of which is stated to be as follows:—

(1.) Constructing machines "wherein one, two, or more screws or other mechanical means are fitted or placed at either end for the purpose of forcing the clay or plastic materials in opposite directions," so that the clay being fed into the two ends of a horizontal trough in which the screws work shall be forced by the pressure of the blades of the screws towards the centre, where it escapes in continuous streams through moulding orifices in the sides of the trough.

(2.) Having proposed to substitute blades for the thread of his

screws, the inventor claims "the application of knives either to "double or single shafts, for the purpose of mixing and forcing "clay through the die or lateral openings, or for performing the "process known as pugging."

[Printed, 8d. Drawings.]

A.D. 1855, June 6.—N° 1289.

GEDGE, JOHN.—(*A communication from C. J. B. J. Vaultrin.*)—Flat tiles for roofing. These tiles are to be manufactured with protuberances on the face, with hollows at their back, projections on the under face to catch the lath, and grooves and clip joints at the edges and sides intended to exclude rain and snow. For the exact forms of the grooves, &c. consult the drawing.

[Printed, 6d. Drawings.]

A.D. 1855, June 20.—N° 1408.

GERNON, JAMES.—*Provisional protection only.*—"This invention consists in hardening articles of clay during the process of distilling coal tar. The clay is first moulded to the desired form and dried as is usual for preparing articles of clay for burning them. In place of burning, the article is inserted into a still with coal tar, and the coal tar is distilled to obtain products therefrom in the ordinary manner."

[Printed, 3d. No drawings.]

A.D. 1855, June 23.—N° 1443.

PEARCE, WILLIAM.—An invention applicable to the class of machines which produce pipes and other hollow articles by expressing the clay through a moulding orifice with a core fixed within it, and having it for its object so to fix the core that connecting rods passing between it and the mould shall not be requisite, such rods being apt as it is here stated to render the articles unsound in consequence of the clay being cut through by them and only partially joined.

This machine consists of a vertical cylinder with the moulding orifice at the bottom; the die or core is on the lower extremity of a fixed shaft that passes up the centre of this cylinder, and upon

which the piston for compressing the clay is free to rotate, it having an internal screw to fit the shaft, so that it rises or falls as it is turned to the right or left.

Clay is fed in from the top and the piston pressed down by communicating rotary motion to it, till the whole charge is expelled, when it is screwed back again and a fresh supply introduced. A continuous stream of clay, fed in from between rollers, may, if desired, be substituted for this arrangement of the piston.

[Printed, 7*d*. Drawings.]

A.D. 1855, June 29.—N° 1486.

ECCLES, JOSEPH.—1. Machinery and arrangements for digging clay earth from the bank for subsequent manufacture into bricks, &c. This is effected by a series of teeth or scrapers mounted on a drum and caused to operate against the face of a bank of clay three or four feet high. A portable steam engine is combined with the carriage for the drum, and the whole travels along rails temporarily laid parallel to the bank of clay, the machine being so arranged as to advance itself a step after each series of knives has acted on the clay.

2. Arrangements, where steam power is employed, by which the flue from the boiler to the chimney is carried under the floor of a drying shed for bricks, &c. to warm the air, while the exhaust steam from the engine is caused to heat water, which afterwards circulates through pipes; steam from the boiler is also caused to circulate through other pipes in the shed.

3. Arranging several kilns for burning bricks, with a system of flues and dampers, as shown on the drawing accompanying the Specification, so that by a centrifugal fan the heated air can be drawn out of any kiln, the contents of which have been burnt and require to cool, and can be propelled into any of the other kilns where the contents are as yet unburnt.

[Printed, 1*s*. 5*d*. Drawings.]

A.D. 1855, June 30.—N° 1490.

WOODCOCK, WILLIAM.—This inventor observes, “the nature
“ of my invention consists in the application of an inclined
“ trough to those machines for making bricks and other articles

" of plastic materials in which a circular horizontal table is employed, and in combining therewith sliding dampers, by which the proper quantity of plastic material is supplied to the moulds, and also in the machinery for raising the said dampers."

A guide with a suitable incline causes the damper belonging to each mould to rise just before that mould comes to the hopper that feeds the clay, so that a small heap is carried forward before the damper in addition to the charge in the mould, and enters the inclined trough above referred to, which is closed above and open below. "The upper end of the damper then comes in contact with and is gradually depressed by the inclined trough, thereby preventing the escape of the clay collected in front of the damper, and causing it to be compressed into the mould by the inclined trough."

After the moulds, in completing their circuit, have passed from under this trough, an inclined plane, acting on false bottoms in them, forces out the brick upward. The shanks of these false bottoms pass round in a channel made for the purpose in the guide that elevates the dampers.

[Printed, &c. Drawings.]

A.D. 1855, July 2.—N^o 1494.

TOOTH, WILLIAM HENRY.—Sundry "improvements in the machinery for and in the manufacture of earthenware and plastic articles, and in the preparation of clays and other materials," described as improvements upon an invention for which Letters Patent, N^o 12,465, were granted to the same inventor, 8th February 1849, which invention is not included in this series, as it merely refers to the preparation of clay, &c., and the manufacture of articles of earthenware, &c., without embracing the manufacture of bricks or tiles.

1. Forming perforated bricks by passing clay over a core and then through a conical mould, the core being of a form suitable to form a series of channels in the clay, and the mould being adapted to compress it, squeezing the edges of these channels together and leaving the deeper portions of them as perforations *through the clay*.

2. Setting on the shaft of a pug mill "flat knives so placed as to produce the effect of a screw," so as to dispense with the piston described in the former Specification.

3. Making "sewer blocks" with rabbets, grooves, or projections to form a bond.

4. "Making of tiles in the shape of common corrugated iron, and with a number of ribs on the under side to give strength thereto," and making openings in tiles of clay to receive squares of glass.

5. Exhausting the air from under sieves so as to force through them, by atmospheric pressure, any plastic materials requiring to be sieved fine.

6. Making chimney-piece jambs of clay forced through a die, two to be made together, connected with a thin portion of clay to prevent their warping in burning; and protecting the bottom of them with an iron shoe or guard.

7. Building kilns in the shape of a ring to reflect the heat, and making stove backs also to reflect the heat, with a vessel for burning fuel in shape of a goblet to stand on a foot in front of it, or to be fastened to the stove facing.

8. In the manufacture of waterclosets, as set forth in the above-named patent, forming the various parts in moulds by pressure instead of by hand, and grinding them in a lathe till they are air-tight.

[Printed, 7d. Drawings.]

A.D. 1855, July 7.—N^o 1524.

NEALE, EDWARD VANSITTART.—*Provisional protection only*.—

1. Glass labels. 2. "Consists in the use and employment of "moulded or cast glass, decorated on its under surface with a "pattern or device in and for the manufacture of tiles and other "architectural decorations."

[Printed, 8d. No drawings.]

A.D. 1855, July 7.—N^o 1525.

PYM, JOHN.—*Provisional protection only*.—"A new combination "of materials suitable for building purposes," to be cast in moulds after having been heated in a cauldron.

The ingredients are equal quantities of bitumen and carbonate

of lime, a small proportion of sal-ammoniac, as much coarse sand or grit as will mix freely with the melted materials; and, according to the article required, resin, shellac, glue, or pitch, or else shavings or some other fibrous substances.

[Printed, 2d. No drawings.]

A.D. 1855, July 11.—N° 1544.

PRATT, HENRY.—(*Partly a communication from Edward Harrison.*)—This invention refers chiefly to the construction and arrangement of flour mills, and the mode of driving them. It includes, however, a novel mode of constructing brick inner walls.

The walls are to be $6\frac{1}{2}$ inches thick, and are to be constructed of bricks, the bricks intended for headers being exactly that length, by $4\frac{1}{4}$ inches wide, and $2\frac{3}{4}$ inches thick; those intended to be laid as stretchers are to have the same thickness, with a length of 9 inches and a width of $3\frac{1}{16}$ inches.

Another portion of this invention “is to so form the bricks at certain places that in working them up vertical grooves shall be formed for the purpose of receiving wooden slides to form secondary divisions.”

These walls, when they carry floor joists, are intended to be corbelled out to a greater width at the top.

[Printed, 3s. 7d. Drawings.]

A.D. 1855, July 11.—N° 1556.

WILLIAMS, WILLIAM.—Improvements in the manufacture of socket pipes, and in the working of brick, pipe, and tile machines.

The pipe is to be formed by any ordinary machine which expresses the clay through a die, only that to form the interior of the socket a mould of the form of the interior of such socket and sliding in guides is pressed up against the button of the die plate, and the form of the outside of the socket is given by a suitably-shaped projection from the face of the die plate. When the socket has been formed, the pressure being withdrawn, the ordinary length of pipe is allowed to pass the die, pushing the socket mould before it along the guides.

Actuating the pistons of brick or tile machines “by means of a cam or eccentric on the main axis, which acts on rollers on the backs of the pistons.”

[Printed, 6d. Drawings.]

A.D. 1855, July 17.—N° 1600.

PIDDING, WILLIAM.—This invention consists in, 1, forming a building material by cementing together with “a cement formed of pulverized silica dissolved in a strong or highly concentrated alkaline solution, rendered caustic with lime,” fragments of coke or stone, or sundry other “earthy or metallic matters,” to form blocks, which are afterwards to be solidified by pressure and heat.

2. Forming drainage pipes of suitable materials cemented together by “caoutchouc, gutta percha, or a combination of both;” such pipes to be in lengths, and, by preference, of angular section.

3. Forming a building material by compressing into moulds coke, charcoal, or sundry similar substances, coated with papier maché pulp; or by compressing peat alone or peat mixed with coke, cinders, or scorix, into moulds, and carbonizing the whole.

[Printed, 3d. No drawings.]

A.D. 1855, July 19.—N° 1626.

WRIGHT, SAMUEL BARLOW, and GREEN, HENRY THOMAS.—This invention consists of, 1, an improved method of pugging and screening clay. The pug mill is perforated, and wider at the top than the base, while on its axis is mounted, in addition to pugging knives, a hollow cone also perforated. The clay forced by the working of the knives through the perforations of the mill and the cone falls partly outside the mill and partly within the cone. The roots, stones, &c. are discharged through a space left between the cone and the barrel of the mill at the bottom. The perforated cone may, it is added, be dispensed with, and a barrel of very strong iron wirework may be substituted for the one of perforated iron.

2. “A method of applying water to lubricate the dies of brick and tile machines. For this purpose the die is lined with plates of metal overlapping each other, and the water is admitted” behind such plates and passes between them to the face of the die.

3. Finishing the face of moulded bricks “by bringing them, when in a dry but unburnt state, into contact with a revolving block, with a similar moulding on its periphery.” This block is,

by preference, a grindstone with the edge molded, but may be of hard wood, "on to the surface of which a coating of sand is attached by cement."

[Printed, 7d. Drawings.]

A.D. 1855, July 27 —N° 1710.

BRIDGEWATER, WILLIAM.—This invention is stated by the patentee to consist in "the subjecting of clay to mechanical pressure after it has been moulded or shaped either by hand or machinery in the ordinary manner into the form of roofing or other tiles, and then partially dried, whereby I am enabled to produce tiles of the very best description from 'blue lias clay' and other dense clays." The tile is to be placed in a frame to prevent its spreading laterally, and compressed between two surfaces of hard wood, under a pressure of at least one and a half tons.

[Printed, 3d. No drawings.]

A.D. 1855, August 16.—N° 1863.

MONK, SAMUEL. — *Provisional protection only.* — "Improvements in bricks for draining, sewerage, and other purposes." The bricks are to be either rebated, grooved, fitted with projections and corresponding hollows, or in some other way caused so to "tie in" one with the other lengthway as well as sideway, that they "could be put together in a self-sustaining arch, and finished by grouting or cementing on the top."

[Printed, 3d. No drawings.]

A.D. 1855, August 24.—N° 1920.

EFFERTZ, PETER.—*Provisional protection only.*—This invention consists of improved machinery for making bricks, tiles, pipes, &c. This machinery consists of two square cylinders side by side, each fitted with a piston, exercising in its upward stroke a pressure on the articles to be formed. "Each cylinder is provided with a cover, and between the cover and the top of the cylinder a space is left for the mould to be slid in."

When the piston is at its lowest, a charge of prepared clay is thrown on to it, and then the moulds are slid forward, and the

cover closed over them. The ascent of the piston drives the clay into the moulds, which, with the formed bricks or other articles in them, are drawn out before the piston falls, and during its descent the cover is caused to open to admit a fresh supply of clay.

[Printed, 3*d*. No drawings.]

A.D. 1855, August 24.—N° 1921.

SCHLICKEYSEN, CARL FRIEDERICH.—1. This invention has for its object, first, “a novel arrangement of apparatus constructed “ on the pug mill principle for facilitating the manufacture from “ plastic materials of bricks, tiles, and pipes;” the peculiarities of which apparatus are that at the top of the pug mill shaft is fixed a cutter, which, as it revolves, severs the mass of clay at its edges from the sides of the upper part of the vessel, in order to ensure its descent; that the radial blades are so set round the shaft, that each of the blades is in advance of the blade below it, and thus an overlapping of the blades is effected; and that to the bottom of the shaft is attached a shallow vessel forming a rotating false bottom to the pug mill. The clay is expressed with force by this machinery through a moulding orifice in the side of the lowest part of the mill.

2. A modification of this apparatus to be applied to the washing of earths. In this modification the central shaft is made hollow to receive a supply of water from above, which it distributes through small perforations below the rotating knives. The water and earth fall through a fine sieve into a vessel fixed below the pug mill, and by the action of a “riddle” or stirrer made of wire-cloth are caused to flow away from this vessel through an outlet.

[Printed, 7*d*. Drawings.]

A.D. 1855, September 4.—N° 1999.

CONIAM, THOMAS TAYLOR.—The object of this invention is an improvement in the shape of tiles for roofing. The tiles are to have flanges formed round two sides and one end of each tile upon one face, and along the remaining end also a flange, but upon the opposite face, and a small groove is formed where the end flanges join the plain face of the tile. In employing these tiles, which are made slightly wider at one end than the other, for roofing, they are fixed to the battens by nails driven through

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holes left for the purpose, and the side and end flanges are caused to overlap, so as to lock all the tiles together. The advantages claimed are, prevention of leakage, diminution in amount of pointing required to be done in mortar, and increased lightness on account of the small overlap required.

[Printed, 6d. Drawings.]

A.D. 1855, September 15.—N° 2085.

HILL, DAVID.—“ This invention consists of combining and “ melting limestone with ironstone, or with the cinder from “ puddling furnaces, or from ball or mill furnaces, and of running “ or casting the same into moulds or otherwise, and thus making “ a material capable of resisting fire, especially suitable for the “ interior of puddling and other furnaces.”

[Printed, 3d. No drawings.]

A.D. 1855, October 25.—N° 2389.

PLATT, JAMES, and WHITEHEAD, JOHN.—This invention has reference to the preparation of clay from which bricks are to be made, and its object is “ to divide ‘ crude ’ or untempered clay “ into small particles, and to separate stones or other hard materials therefrom.” The clay being fed into a hopper, falls upon two parallel rollers, and is pressed down upon them by a series of “ stampers,” which move up and down. Rotary motion is given to the rollers, so that the clay is delivered between them. The portions of the invention specially claimed as secured by the patent are the following :—

1. The use of a division bar or plate, in section like the letter **V** inverted, and the upper edge and face of which it is preferred to make corrugated. This plate, fixed under the small space between the two rollers, divides the clay which these force down upon it into two portions, of which one is directed to the one side, and one to the other side by it.

2. A pair of “ revolving toothed rollers ” fixed near the two lower edges of the dividing plate; these “ effect a scraping off “ of the material, and break it up into still smaller particles, which “ then fall through an orifice.” The clay may now be used, but to effect, when needed, a further separation of particles, the inventor claims,—

3. “ Constructing screens for the purpose aforesaid, so that the

"openings are concentric with the circle through which the said "screen moves." These screens are cylinders, composed of a series of rings, fixed side by side with narrow spaces between. They are supported by rollers, are fixed in a slightly inclined position, and receive rotary motion. The clay to be sifted is fed into the higher end of the screen, all the finer particles are delivered through the openings, and the coarse particles, stones, &c., which are left behind, drop out at the lower extremity.

[Printed, 9d. Drawings.]

A.D. 1855, November 7.—N° 2511.

BROWNE, CHARLES ALLEN.—"A machine for manufacturing "bricks." In this machine the moulds, of which there may be any even number, are fixed upon the face of a skeleton wheel, revolving vertically, and are carried in succession, first under a hopper to receive a charge of clay, and then under two compressing pistons outside of the wheel, each of which exerts a pressure on the clay. Each mould has a moveable plunger inside the wheel, forming a bottom to it, and, at the same time that the second piston is giving its compression to the outer face of the clay, two arms with hooks seize this plunger, and draw it outwards, thus compressing the inner face. When the further revolution of the wheel has brought the brick mould to the lowest point, the wheel remaining at rest, two hooked bars, the mechanical mode of actuating which, as shown on the drawings, is specially claimed, again draw the plunger forward, bringing it quite out of the mould, and thus delivering the brick.

The amount of clay fed into each mould can be regulated by moving a quadrant, which fixes the distance to which the inside plungers are allowed to fall, and the exact position of the skeleton wheel, while kept stationary to receive compression, is regulated by a V-shaped fork, carried by one of the plungers, and so bearing against a pin fixed on the wheel as to ensure that the outside plungers shall enter the mouths of the moulds.

A.D. 1855, November 20.—N° 2609.

SCHWARTZ, THEODORE.—*Provisional protection only.*—The nature of this invention is stated to consist in enlarging, either by

ribs, grooves, corrugations, or any other such means, the surface of any receptacle or vessel constructed for the heating or drying of plastic or solid bodies. "The object of this enlargement of surface is to accelerate and increase the action of air or flame in heating or drying." The inventor, in describing several objects to which this is to be applied, states, "the invention is applicable, and I contemplate its application to bricks."

[Printed, 3d. No drawings.]

A.D. 1855, December 13.—N° 2813.

ROBERTS, JOHN.—*Provisional protection only*.—"A peculiar combination of mechanical parts for moulding bricks and tiles." In this machine a circular track is formed, around which one or more heavy rollers are made to revolve, and in this track are fixed separate sets of moulds open at the top and having moveable bottoms capable of being elevated from below. Clay slightly moist is to be fed into the moulds by hand, and will be pressed down in them by the roller. After the roller has passed the whole of one set of moulds, it is caused to act on a lever arranged to lift the moveable bottoms of all the moulds in that set, and thus to lift the bricks into a convenient position for removal by hand. See Abstract of Specification to Letters Patent granted to the same Inventor, A.D. 1856, May 26, N° 1261.

[Printed, 3d. No drawings.]

1856.

A. D. 1856, January 4.—N° 33.

GREY, ROBERT.—Improvements in machinery for making bricks, tiles, pipes, chimney pots, &c., by expressing clay by continuous pressure through dies. These improvements consist in the employment of a pug mill fitted with an Archimedian screw, and furnished near the bottom with lateral openings arranged so as to express the clay not in a line radiating from the centre of the pug mill shaft, but in a line which forms a tangent to a small circle drawn round that centre. The moulded stream of clay is received on a travelling platform of rollers, and having filled the platform carries it forward for a short space, during which wire cutters in a frame which shares the onward movement of the

platform are caused to pass from side to side, dividing the moulded clay into lengths ; these articles can then be removed, after which the travelling platform returns to its position at the mouth of the die or moulding orifice to receive a fresh supply of moulded clay.

[Printed, 9d. Drawings.]

A.D. 1856, January 21.—N° 159.

POCKSON, JAMES.—An improvement in roofing tiles, and which consists in forming them in two distinct parts, one called the upper and the other the under tile. The under tiles are constructed to present a cross section like a flat V, and the upper tile is made of similar section, except that it is to be reversed A. The under tiles have a projection on their under surfaces by which they hang on the lath ; and the upper tiles, which may have a large portion of the sides cut away into an ornamental pattern, are so placed that each one lies over and covers the junction of two adjacent under tiles.

[Printed, 7d. Drawings.]

A.D. 1856, February 14.—N° 383.

TAYLOR, JOHN.—“An improvement in constructing and facing “ walls.” This improvement consists in a further use of the flanged facing slabs, blocks, bricks, tiles, &c., the form and use of which formed the subject of Letters Patent N° 12,464, granted to the same inventor February 8, A.D. 1849. These tiles according to this improvement are to be employed as facing to a wall built partly of brickwork and partly of concrete ; “ headers ” project from the brickwork at intervals, and upon them rest the flanges of the facing slabs or blocks, all the intervening space being filled with concrete, which will aid in bonding the brickwork with the facing slabs.

[Printed, 5d. Drawings.]

A.D. 1856, March 11.—N° 592.

FOWLER, JOHN.—This “ invention is applicable to machinery “ where screws are used to express clay or brick earth through “ moulding orifices or dies,” and has for its object to prevent the clay revolving with the screws ; this is to be effected by so applying, through the cases of the screws, discs or screw wheels, with notches in them on which the thread of the screw works, that the discs or wheels shall be caused to rotate by the screw, “ by which means

" the portions of the discs or screw wheels within the cases will
 " act as longitudinal partitions in the cases of the screws and
 prevent the rotation of the clay or brick earth."

[Printed, 1s. Drawings.]

A.D. 1856, March 15.—N° 628.

DUMAS, JOSEPH.—(*A communication from Frederick Arnaud.*)—
 Tiles for roofs, pavements, floors, and walls of such forms that
 when combined they may present an uniform surface and yet be
 impervious to water, form the subject of this invention. Two
 patterns, namely under and upper tiles, are employed, the under
 tiles being of such form " that they may be fitted together in one
 " direction by mortice or socket joints, and in the other or
 " transverse direction by raised ledges on their respective edges
 " abutting against one another," each tile having also a raised
 rib intermediate between these raised ledges. The upper tiles
 are laid with their edges fitting the raised ribs just referred to,
 so that the middle portion of each upper tile covers the joint
 of two under ones, and suitable ledges being formed on the under
 side of the upper tiles, they firmly clamp or bind together the
 joints of the under series.

The under tiles will, from their shape, act as continuous gutters
 or channels for the conveyance of any water that may penetrate
 the joints of the outer tiles.

[Printed, 7d. Drawings.]

A.D. 1856, March 31.—N° 774.

BIRD, GREGORY. — *Provisional protection only.* — Employing
 asphalte or asphaltic or bituminous compositions for the manu-
 facture of blocks, copings, cornices, and other structural portions
 of buildings.

[Printed, 3d. No drawings.]

A.D. 1856, April 4.—N° 817.

ROBERTS, JOHN.—*Provisional protection only.*—Improvements
 in the manufacture of ornamental tiles. 1. Pressing prepared
 clays of the colours required through separate dies of shapes
 corresponding to the various parts required to form the intended
 pattern, and then combining the forms so produced into one mass,
to be consolidated under pressure, and from which slices of
required thickness are to be cut.

2. Placing, on the clay intended for the ground of a tile, moulds to define the pattern, filling the same with coloured clays, and then incorporating the pattern so produced with the first slab of clay by pressure.

3. Strengthening tiles, when requisite, by adding cement to them at the back, and for certain purposes inserting there a piece of iron with a hole in the centre of it tapped to take a screw for fixing the tile.

[Printed, 3d. No drawings.]

A.D. 1856, April 7.—N° 836.

GEDGE, JOHN.—(*A communication from Charles Pandosy.*)—*Provisional protection only.*—This inventor says, “I propose to make “tiles of any material, and so to arrange projections or receptacles “on or in each, that when put together they shall form an area of “any dimension. The tile itself will have the form of a parallelogram, and may be made to any convenient size.” As shown on the drawing, this tile has one side and one end raised, and the remaining side and end formed to fit on to the adjoining tiles; there is a lozenge on the face of each, and each has a cramp and lugs for fixing on to laths or boards. These tiles are used for roofing without mortar or cement.

[Printed, 5d. Drawings.]

A.D. 1856, April 21.—N° 948.

NASMYTH, JAMES, and MINTON, HERBERT.—Improvements in machinery for manufacturing tiles, bricks, &c. from pulverized clay. The nature of this improvement consists in working the compressing die or dies by the action of an eccentric shaft fixed above and in contact with them. A portion of the periphery of this shaft at the point most remote from the axis has been removed, so that “each rotation thereof shall effect the first compression of the pulverized clay in the die box, then release the “compression to allow the confined air to escape from among the “particles of pulverized clay, and then effect the final consolidation compression.” The dies are caused to rise off the compressed clay as the eccentric shaft revolves by the action of springs at the extremities of a cross-head fixed at the upper part of the machine, and to which they are connected by iron rods.

[Printed, 7d. Drawings.]

A.D. 1856, May 5.—N° 1057.

BULMER, WILLIAM, and SHARP, ISAAC.—1. The employment of a revolving arm or arms working in a chamber beneath “or connected with a pug mill for the purpose of pressing the clay or other plastic material into dies or moulds;” also the employment of guide rods to steady plastic material entering moulds, whether directly from a pug mill or from a chamber connected therewith.

2. Introducing steam into or among or in contact with plastic material in order to facilitate its exit from moulds.

[Printed, 6d. Drawings.]

A.D. 1856, May 5.—N° 1060.

GREGORY, WILLIAM.—“Roofing tiles with a rib or fillet on one side to stand up above the face of the tile, and an arched lapping piece on the other side or edge of the tile, with a groove therein, to fit the fillet or rib of the adjoining tile;” this arched piece being enlarged at the lower end of each tile into a recess large enough to receive the arched rib of the tile immediately below it on the roof, and of a length equal to the intended “lap” or overlapping of the lower edge of each course of tiles beyond the upper edge of the course below. Ridge tiles may be constructed in a similar manner. Tiles of any material and fluted, or of other than the ordinary shapes, may be manufactured with these joints.

[Printed, 8d. Drawings.]

A.D. 1856, May 14.—N° 1142.

GIBSON, CHARLES.—1. Improved machinery for the manufacture of bricks, tiles, pipes, &c. In this machinery the prepared clay is fed by feeding rollers or a pug mill into a feeding box having a reciprocating motion; variations in the construction of the box are admissible, and it may oscillate in a horizontal plane or in a curve, but in all cases it is divided by a partition midway between its two ends, each half receiving a charge of material alternately, and then conveying the same to the side of the machine, where it is moulded. The moulds may be variously arranged; they may be arranged on two circular drums or on segments, one at each side of the machine, the action of the feeding box itself causing the clay to enter them; or they may be fixed moulds *similarly fitted*, and with cores to form hollow bricks, cutters to cut *off the clay* in the box from the brick before the reciprocating box

retires from the mould, and pistons to force out the finished article; or the clay may be forced out of each half of the reciprocating box in turn at the extremity of its traverse by a piston working vertically and driving it into a mould, from which, after the box has retired, it can be again expelled as a moulded brick; or a moulding orifice or die may be fixed at each side of the machine, and the reciprocating box may be caused to expel a portion of clay alternately through either orifice.

2. "Constructing the moulds with open ends, and passing them " when filling with clay, between two fixed plates, so as to form a " complete box, and thereby preventing the clay from hanging or " dragging when discharged."

[Printed, 1s. 2d. Drawings.]

A.D. 1856, May 26.—N° 1261.

ROBERTS, JOHN.—"Machinery for moulding bricks and tiles." In this machinery separate sets or series of moulds, formed according to the shape of the articles intended to be produced, are fixed at intervals in a circular track, and into them earth or clay is shovelled by hand, each mould having a piston or moveable bottom, which, when the material is introduced, is in its lowest position. "A heavy roller or rollers is made to revolve around the " circular track, and to press on the clay or brick earth when such " roller or rollers pass over a series of the moulds set or fixed in " the circular track; and when such roller or rollers have passed " over and pressed the clay into a set or series of moulds, one or " both of them in passing over the end of a lever (to which all the pistons of the series of moulds are connected) will cause the " lever to raise the whole of the pistons of such series, and thus " lift the bricks or tiles above the upper edges of the moulds;" the bricks can now be removed by hand, the roller passing on to compress the clay which has been filled into another set of moulds. This is apparently the same invention as that described in the Provisional Specification of the same Inventor, dated A.D. 1855, December 13, N° 2813.

[Printed, 9d. Drawings.]

A.D. 1856, May 23.—N° 1270.

OWEN, LEMUEL D.—(A communication.)—"The manufacture of " blocks of artificial stone from sand or other pulverulent silicious

“ matter in combination with lime, and formed in moulds under “ great pressure,” the sand or other material to be dry and the lime newly slacked. The blocks, if larger than a common brick, should be perforated with one or two holes to admit air, and after moulding they must remain exposed to the air till sufficiently hardened or ripened. “ For blocks intended for building in water, “ water lime is used.”

[Printed, 3d. No drawings.]

A.D. 1856, June 4.—N° 1324.

BRIGGS, JOSEPH. — This invention consists in constructing blocks and bricks for building or paving in forms corresponding with each other, and so that each separate block or brick has two or more apertures made therein for the purpose of receiving two or more pins, ties, or bolts, so as to hold the blocks or bricks together, the apertures being so placed that when two or more blocks are brought together in the positions they are intended to occupy, one or more of the apertures in each block shall correspond with or come opposite to one or more of the apertures in each adjoining block of the same course, so as to admit of the passage of tie rods through them.

[Printed, 9d. Drawings.]

A.D. 1856, June 17.—N° 1422.

GEDGE, JOHN.—(*A communication from E. A. Heurteau.*)— “ Bricks of divers forms, which are to serve for any kind of “ moulding or archwork in buildings.” Mouldings, if the arch is to appear moulded, are to be formed in the bricks, and on the back of each brick grooves are to be made, “ so as to form, when “ fixed, rebates, upon which will rest the tympanes of vaults, which “ may thus be made of common bricks.”

[Printed, 3d. No drawings.]

A.D. 1856, June 19.—N° 1445.

SCHWARTZ, THEODORE.—This invention consists in the formation of bricks or building blocks of the size of ordinary bricks, or of any other convenient size, and having a cavity extending from the upper to the under surface. This cavity is corrugated or moulded into ridges or ribs at the sides, and it may be, if wished, contracted to a narrow opening at one or both of the faces of the

brick, or may be strengthened by "the insertion or attachment of "parts separately moulded." Also "making perforated bricks "on the expression system, with two or more connected cavities "or independent holes, by means of a single core." These cavities may be so placed alternately on opposite sides of a central cavity, that ridges separating them shall be arranged in a zig-zag fashion, or they may be placed in pairs. Projections may be added to prevent the cavity from closing through the sagging of the brick while green.

[Printed, 10d. Drawings.]

A.D. 1856, June 25.—N° 1498.

PLATT, JAMES, and WHITEHEAD, JAMES.—1. This invention relates, first, to brick machinery, in which a series of moulds are traversed by a "mangle-wheel motion," and consists in the application of a swinging frame, by the use of which the driving parts are adjustable to the angle required by the motion of the pinion in the mangle wheel.

2. The second part of this invention applies to machinery for which Letters Patent were granted to James McHenry, dated 20th July 1852, N° 14,234, and consists of the use of a roller over which each mould piston passes in succession, and by which it is slightly raised, in order to loosen the pressed material in the moulds previously to its being forced out.

3. "As applied to the said machines, the use of a moveable "tappet or other such apparatus for acting upon the elevating "apparatus, so that the action thereof may be prevented, if "desired."

[Printed, 10d. Drawings.]

A.D. 1856, June 28.—N° 1527.

BELLFORD, AUGUSTE EDOUARD LORADOUX.—(*A communication*).—*Provisional protection only*.—"Improvements in drying, "burning, and cooling bricks, tiles, and other ceramic substances." The apparatus used consists of two parallel tunnels or vaults connected at the ends; of these one having a furnace at its lower extremity is used as an oven, and the other as a cooling chamber. On the brick floor of these chambers rails are laid to such a slope that cars or waggons filled with the bricks, &c. may travel along them without locomotive power. Over these two

vaults runs a third, used as a drying chamber, and heated by the waste heat from the others ; this also has rails laid along it, and may be divided into several chambers. Openings communicating with a flue, and others for the introduction or removal of goods, also a pit to receive any material that may fall, are provided for. See Abstract of Specification to Letters Patent granted to this Inventor, A.D. 1856, December 4, N° 2882.

[Printed, 3d. No drawings.]

A.D. 1856, July 1.—N° 1537.

SANDERS, FREDERICK GEORGE.—Improvements in the manufacture of ornamental tiles. 1. Making tiles, each of which contains the whole or some portion of an ornamental design, by placing together a number of previously moulded squares or other figures, each of the thickness of the intended tile, and executed in coloured pulverized clay compressed in any suitable machine, previous to subsequently consolidating the whole into one by a second powerful pressure. Or making the tile with the ornament forming only a part of its thickness, by moulding it with a recess or recesses on the face, into which pulverized coloured clay or pieces of plastic coloured clay can be pressed to form the pattern or design. Or the pattern may be formed of pieces of coloured clay, as thin as may be desired, laid in a mould, which is filled up behind them with sufficient pulverized clay to give the required strength.

2. "Printing upon paper or other suitable substance with an adhesive substance a design or ornamental figure, on which is scattered coloured clays ; this paper, with the coloured matters adhering," is then placed in the mould, which is filled up with other clay, and the contents being consolidated by pressure, the pattern remains on the face of the tile.

3. In order to prevent cracks appearing in tiles made from pulverized clay, making "the upper or lower piston slightly concave, commencing from the outside to the centre."

[Printed, 3d. No drawings.]

A.D. 1856, July 2.—N° 1556.

NOURISSON, ALFRED.—*Provisional protection only*.—A peculiar arrangement of a kiln for drying and burning bricks and other articles made of clay. The kiln consists of a furnace and a series of chambers, the bottoms of which chambers are formed in sections

and are moveable. The bricks, loaded on a carriage, first pass through a drying stove, and then are placed on one of these sections to be transported through all the chambers successively to the hottest one. The section and its cargo are from thence caused to descend to a cooling chamber, the furnace being moveable, so as to allow the sections to pass. Sometimes, in place of heating from a furnace, fuel is placed on the moveable sections along with the articles to be burned, and the combustion is regulated by dampers, which increase or diminish the supply of air.

[Printed, 3d. No drawings.]

A.D. 1856, July 7.—N° 1589.

CHENOT, ALFRED LOUIS STANISLAS, and CHENOT, EUGÈNE CHARLES ADRIEN.—This invention has for its object so to compress metallic sponges, dust, and other matters that can only be rendered cohesive by extreme compression, so as to produce a considerable reduction in their bulk, and may be applied, among other purposes, to the moulding of clay. Pressure will either take place in a conical die open at the further end, where the frictional resistance of the already compressed material, as it approaches and leaves the mouth of the die, affords the necessary resistance to secure the compression of the newly introduced matter; or it may take place between one stationary and one moveable piston, working in a die, a core being introduced if a hollow article is to be formed, or it may take place between two pistons caused to approach one another within the die or mould.

Various forms of machine, acting by hand-power through levers, by steam-power, by the force of an hydraulic press, and by concussion, are shown and described in the Specification, but the inventors do not confine themselves to these, or to any special mechanical means of producing pressure.

[Printed, 2s. 7d. Drawings.]

A.D. 1856, July 12.—N° 1649.

PETRIE, WILLIAM.—A new porous material for filters and such like articles, applicable with modifications to vessels, pipes, tiles, blocks, &c., and for use as a coating or a cement. Grains of siliceous sand, or similar suitable matter of uniform size, are to be incorporated by mixing them with sulphur at such a temperature as will melt the sulphur; the compound, while hot, is cast in

suitable moulds, and the articles are rendered porous by throwing cold water on them in the mould, or by casting them with a "tail," into which the surplus sulphur may settle, and which can be cut off afterwards.

For sulphur the inventor proposes sometimes to substitute what he terms "compound sulphur," *i.e.*, a thoroughly incorporated mixture of sulphur and finely powdered clay or siliceous or hard carbonaceous matter, liquefied by heat; this substance may be employed alone to form non-porous articles.

For many purposes a small proportion of resinous matter, mixed with the sand or powder before admixture with the sulphur, will improve the composition. For solid material and for cement grains of the sand or other material of mixed sizes, from the finest to such a degree of coarseness as the nature of the intended article will admit, are, after being previously heated, to be incorporated with sulphur or compound sulphur, as described above, and cast; such casting may have a "head" in which surplus sulphur can collect.

[Printed, 4d. No drawings.]

A.D. 1856, August 14.—N° 1898.

BROOMAN, RICHARD ARCHIBALD.—(*A communication.*)—*Provisional protection only.*—Compositions for the manufacture of the following articles:—1. An artificial stone to be manufactured from a mixture of lime, ashes, or cinders, with a pulverized earthy oxide (to be obtained by "treating clay or natural stone by heat, " and disengaging the water and gases contained therein"), together with water and sand.

2. Asphaltic stone, made by "substituting an asphaltic oxide for the sand in the above mixture, and adding dried powdered " peat or other fuel."

3. A fire-brick or "refractory building material," to be made "by combining an oxide of Lалуque clay, or other fire-proof or " refractory earth or stone with sand."

[Printed, 3d. No drawings.]

A.D. 1856, August 28.—N° 2004.

GARDISSAL, CHARLES DURAND.—(*A communication.*)—1. The "manufacture of bricks, tiles, drain pipes, or other earthenware or

"ceramic manufactures of combustible material," composed of clay, coal-dust, and a nitrate or nitric acid, worked up with a solution of alum; the articles so made being placed in the ovens, kilns, or piles where other similar articles made from clay are to be burned, and not only serving as a combustible or fuel, but also themselves remaining, "after complete combustion," perfect but porous bricks, tiles, &c.

2. The manufacture and use of this combustible material for the purposes of fuel.

[Printed, 3d. No drawings.]

A.D. 1856, September 5.—N° 2071.

BURSTALL, THOMAS.—*Provisional protection only.*—This invention is an improvement upon the one which formed the subject of Letters Patent, granted to the same inventor, 1st December 1851, No. 13,839. In the former invention bricks or tiles were moulded from pulverized clay by machinery giving pressure to one side of the brick only. In the present improvement both sides are to be compressed simultaneously, an elastic pressure being exerted upon one side of the brick or tile, at the same time that the pressure derived from a crank or lever or other mechanical power driven by machinery is exerted upon its opposite side. See Abstract of Specification to Letters Patent granted to the same Inventor A.D. 1857, March 5, N° 647.

[Printed, 3d. No drawings.]

A.D. 1856, September 10.—N° 2118.

JOHNSON, JOHN HENRY.—(*A communication from Isaac Harman.*)—*Provisional protection only.*—Apparatus for moulding bricks. In this apparatus the moulds are arranged in sets, constructed in two halves, and capable of being moved asunder or brought together by the action of the machine. The halves being apart, clay is introduced from a suitable feeder into each mould, and when a sufficient quantity has been admitted it is cut off by a sliding knife. The halves of the moulds are now brought together, and compress the contained clay, a hinged plate below and a hinged lid above being both closed down to prevent the escape of any portion of the clay. The bricks being now moulded,

the halves of the mould separate, and the bottom plate having been previously opened, the articles are thus set free and fall upon an endless travelling apron provided to receive and remove them.

[Printed, 3d. No drawings.]

A.D. 1856, September 19.—N° 2198.

LAFFITE, PIERRE.—A machine or engine with a rotary piston, applicable to pumping fluids or expressing plastic materials through moulds, also available for use as an engine for obtaining motive power by the elastic pressure of steam or other liquid. This engine consists of a cylinder having closed ends and a central main shaft passing from end to end. The rotary piston is fitted accurately between the two ends of the cylinder, and forms an eccentric on the central shaft, its most projecting part being always in contact with the interior surface of the cylinder. An inlet and outlet opening are provided, and between them acts a sliding partition fitting the whole height of the cylinder, and so regulated by a crank on the main shaft as always to remain in contact with the rotary piston. Rotary motion being given to the main shaft and the materials to be expelled being introduced through the inlet opening, the rotation of the piston will drive them round before it, till the outlet opening and sliding partition are reached, and as they cannot get past the latter, they will be expelled through the outlet.

When this machine is used as a motive engine, the steam, compressed air, or other elastic fluid is introduced through the inlet, and takes effect on the eccentric piston and forces it round, and then escapes at the outlet.

[Printed, 6d. Drawings.]

A.D. 1856, September 27.—N° 2267.

RANSOME, FREDERICK.—1. Adding to the composition of such descriptions of artificial stone as are compounded with sand, clay, and other mineral or earthy substances a substance (such as pumice stone or a readily fusible glass) "which will fuse more readily than the sand, and will run into and fill the pores of the stone, rendering it more dense than when compounded without such addition."

2. "A method of rendering artificial or natural stone, bricks,

“ and other materials used for building purposes less liable to decay ” by “ the application in succession of two solutions, which by mutual decomposition produce an insoluble substance which is deposited in the structure and on the surface of the stone or other material.”

[Printed, 4d. No drawings.]

A.D. 1856, September 29.—N° 2282.

BOUSFIELD, GEORGE TOMLINSON.—“ This invention consists in a composition of matter to be used as a substitute for stone and bricks for building and engineering purposes ;” the ingredients being “ of ordinary chalk from 80 to 85 parts, and of slaked lime from 15 to 20 parts by measure,” or about those proportions.

[Printed, 3d. No drawings.]

A.D. 1856, October 9.—N° 2364.

KING, THOMAS.—A continuous compressing machine, the essential peculiarity of which is that the pressure is effected between two endless bands “ mounted on rollers of such a size and at such distances from each other as that the two faces of such endless bands, belts, or chains are caused to approach each other gradually for the purpose of continuously compressing materials fed in or placed between them.”

[Printed, 10d. Drawings.]

A.D. 1856, October 20.—N° 2458.

JENNINGS, JOSIAH GEORGE.—1. Caps for walls formed by expressing clay through dies, the dies being so shaped and furnished with cores that the caps shall have longitudinal passages through them, and shall be inclined at the top and provided with plain or ornamental projections at the edges which clip the wall.

2. “ Sleeper blocks for the basements of buildings to receive the wood sleepers or the joists of the flooring,” manufactured with longitudinal passages. The base of each block is made to spread, and the upper surface of each is formed with a longitudinal and in some cases also a transverse groove. It is preferred that these

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blocks and also the cappings be glazed as other articles of pottery ware.

3. "Bricks to be used as substitutes for wood bricks; such bricks are moulded or formed each with a dovetail groove at its end or side to receive a piece or filling of wood."

[Printed, 1s. 11d. Drawings.]

A.D. 1856, October 23.—N^o 2485.

PORTER, JOHN FRANCIS.—Improvements in the manufacture of bricks.

1. "An improved method of preparing the material for making brick, &c., or any analogous material." The clay or earth is introduced, for the purpose of being cleansed and divided, into a large cylinder fixed at an angle of about 45°, and to which very rapid rotary motion is communicated, and is forced through a large number of small openings in the periphery of the cylinder by centrifugal force, any stones, roots, &c., too large to pass being left behind. Also a method of supplying clay to the piston chamber of a machine for forcing clay through a moulding orifice: this is to be performed by causing the pug mill to discharge its clay into a moveable chamber, such as will fit the clay chamber of the machine. This accomplished, the moveable chamber containing the clay is moved to the expressing machine, and subjected to the action of the piston.

2. Adding a die or moulding orifice and some additional knives to the pug mill, described in the Specification of Letters Patent granted to the same inventor, 31st January 1855, N^o 240.

3. "Moulding articles of brick earth by the use of moulding orifices, which differ from a die in this, that the material moulded by such orifices does not slide against the moulding surfaces," the mould being made either wholly of moving endless planes or surfaces, or of these in combination with one or more rollers.

4. Apparatus for use where the surfaces of the moulded article require to be rectified or completed after it has passed the moulding orifice. In this apparatus the clay passes between rollers to compress it above and below, and wires cut it true at the ends.

5. *Forming a hollow in the bed of a brick by the use of a cutter that acts as an arm hinged on a centre.*

6. A machine for expressing clay through a die down upon a moveable table; the requisite thickness for a brick having passed the die, a wire cutting horizontally severs it, and at the same time the cutter above described forms a hollow in its under side. As soon as the brick is removed the moveable table rises spontaneously to meet the clay and receive another article. Also improved rollers for forcing clay through dies, &c. There is a pair of these rollers, each having a deep flange at one end, which overlaps the plain end of the opposite roller, thus providing that every part against which the clay bears shall receive motion.

7. The application of a brush or brushes, revolving or otherwise, to clear away from the moulding surfaces clay or any material that may adhere.

8. The lubrication of the knives and blades of pug mills. The water or other fluid finds access through a channel in the centre of the central shaft, and thence escapes through small perforations immediately adjoining each knife or blade to be lubricated; an hydrostatic pressure from a head of greater or less height will cause the free entrance of the fluid into the mass of clay.

[Printed, 1s. 6d. Drawings.]

A.D. 1856, October 28.—N^o 2524.

BRODIE, WILLIAM.—Improvements in the manufacture of roofing tiles and in machinery for that manufacture. The clay is first expressed by any suitable apparatus through a die of a horse-shoe form, and is cut into lengths called "blanks," each blank to be subsequently moulded into a finished roof tile. The finishing moulds are iron plates, two in number, fixed at the two ends of a horizontal frame, which is free to turn on a central pivot, each mould being also capable of being readily turned over on a swivel or spindle. A workman takes the "blanks," one by one, lays each in succession on the mould, and shapes it, and then swings the moulding apparatus half round horizontally on its pivot, thus bringing the second mould to him, while a second workman on the opposite side of the machine removes each tile successively by placing a "horse" upon it, and then reversing the mould on its spindle, so that the tile drops off on to the horse. Also a similar machine, but with a single moulding plate, turning as before on a

swivel, but fixed to a stationary frame; only one attendant is required for this machine, and he both shapes the tiles and also removes them.

[Printed, 7d. Drawings.]

A.D. 1856, November 12.—N° 2662.

EECCLES, JOSEPH.—1. The first part of this invention relates to improvements in machines for making perforated bricks on the principle of the machinery for which Letters Patent were granted to James McHenry, dated 20th July 1852, No. 14,234, and is supplemental to the invention which formed the subject of Letters Patent, granted to this inventor (Joseph Eccles) 26th October 1854, No. 2283. In order to produce perforations extending completely through the brick (the plugs or cores of the machinery as previously improved having been found in practice to leave a thin film unperforated), "points or plugs are," in this improvement, "made to give the shape of the perforation required, which "are secured to arms, or to a bar or frame, which is arranged so "that the bricks when forced from the mould boxes will come "against the points or plugs, or is arranged so that the bar or "frame has a movement which forces the points or plugs into the "bricks."

2. Manufacturing such articles as can be made by expressing clay through a moulding orifice by means of attaching a clay box, piston, and moulding orifice to a machine on the principle of McHenry's invention, before referred to, the piston being connected to the table carrying the moulds in that machine, and advantage being taken of the reciprocating movement of such table to work it to and fro.

[Printed, 10d. Drawings.]

A.D. 1856, November 14.—N° 2688.

DAY, JOHN ROCK, and RUTTER, THOMAS.—*Provisional protection only*.—An improved metallic tile for roofing. The edges of these tiles are both bent, one being simply turned up, and the other one turned up and bent round. In roofing with them *ribs are to be fixed on the rafter, and the raised edge of one tile being against a rib, the bent edge of the adjoining one will both*

cover this rib and also include the raised edge of the first tile, when both can be fixed by a pin or pins. These tiles have a species of corrugation given to their surface.

[Printed, 3d. No drawings.]

A.D. 1856, November 22.—N° 2774.

WHEELER, JOSEPH.—"A method of converting rotary into "reciprocating motion, especially applicable to machinery for "forcing plastic substances through moulds and dies."

The means employed are described by the inventor as "a "toothed wheel acting upon a double-sided shifting rack." This wheel is supposed to have continuous rotary motion communicated to it, and the toothed rack into which it gears consists of pins held between top and bottom plates, and is placed loosely in a frame connected with the machinery to which a to-and-fro motion must be given. This frame embraces the toothed wheel, so that the loose rack gearing into that wheel and bearing against one side and one end of the frame, rack and frame are driven forward together till the last pin comes into gear, when the toothed wheel carries that pin, and with it the whole rack over through a semi-revolution, and causes the rack to bear against the opposite end and side of the frame to those against which it previously pressed, "and drives it and the whole instrument in the direction "opposite to that in which it had been first propelled, and so "on continuously."

[Printed, 8d. Drawings.]

A.D. 1856, December 4.—N° 2882.

BELLFORD, AUGUSTE EDOUARD LORADOUX.—(*A communication.*)—The invention which forms the subject of these Letters Patent is the same as that which forms the subject of the Provisional Specification of the same inventor, dated 28th June 1856. N° 1527, of which an abstract has already been given.

[Printed, 10d. Drawings.]

A.D. 1856, December 4.—N° 2883.

MARGUERITTE, LOUIS JOSEPH FRÉDÉRIC.—(*Provisional protection only.*)—"Improvements in treating or preparing ma-

“terials to be used in manufacturing retorts, crucibles, bricks, and other kinds of earthenware.”

This invention has for its object to increase the proportions of silica and alumina in clays for the manufacture of these articles, so as to render them infusible. The articles are to be first made in the ordinary manner, and after being dried are to be soaked in a solution of chloride of aluminium or chloride of sodium, and burnt till the hydrochloric acid is entirely driven off.

The acetate and sulphate of alumina will furnish similar deposits.

[Printed, 3d. No drawings.]

A.D. 1856, December 12.—N° 2954.

WIMBALL, HENRY.—Mechanism to be employed in the manufacture of bricks, tiles, &c. Where a pug mill or other machine expelling a continuous stream of clay is employed, this stream is to be received on a continuous travelling carriage or series of carriages to which the clay itself imparts the requisite motion. The surface of these carriages is composed of a series of hinged pallets, of width equal to the thickness of a brick, and with interstices between them. The continuous mass of clay resting on these pallets is first to be cut into separate bricks by cutting wires or plates pressing between the pallets, after which the bricks, having been so cut, are easily removed by hand by turning over the pallets.

Where a pug mill or machine is not employed, a somewhat similar carriage, but with hinged sides, is employed, forming a trough into which the clay is introduced by hand; after being dressed level at the top, the mass is severed by wires or cutters, as before (the sides having interstices to admit the passage of these cutters), and the moulding box is then moved forward out from a frame in which its sides are kept vertical during the process of filling, upon which it falls open, and the bricks can be removed, as before, by hand.

[Printed, 10d. Drawings.]

A.D. 1856, December 12.—No. 2956.

HEADLEY, JAMES HARTAS.—This invention relates to the moulding of artificial blocks consolidated by pressure, the article

presenting an exterior of artificial marble, while its interior is composed of coarser material.

For the interior of the blocks a composition of sand, gravel, or other "pulverable silicious matter" mixed in suitable proportions with freshly burnt lime, ground to an impalpable powder, and moistened, is employed. For the marble facing granulated marble, similarly mixed with ground unslaked lime, and moistened, is employed. The blocks are moulded in a smooth metal mould, into which a lining of the marble composition is first introduced, backed up with the coarser composition. The mass thus prepared is subjected to great pressure, and then removed from the mould, and it gradually hardens by absorption of carbonic acid from the atmosphere.

Hydraulic lime is to be substituted for quick lime where the mass is subject to the action of water, and iron ore, or the oxide of iron, may be introduced into the marble composition as a colouring matter. Should extra hardness be desired, the moulded block may be saturated for a few hours in soluble glass (silicate of potash), and then heated to 300° Fahrenheit.

[Printed, 3d. No drawings.]

A.D. 1856, December 12.—N° 2960.

SHERWIN, GEORGE.—"This invention has for its object improvements in the manufacture of fire-bricks, tiles, crucibles, and other articles where fire-clay is used. For these purposes, in place of employing the fire-clay and siliceous matters in the ordinary condition, they are first 'slipped' separately, and then combined together, and with burned clay and siliceous matters. The fire-clay or marl is prepared by grinding in the ordinary manner, and then 'slipped,' all particles of iron ore, stones, and other substances (not clay) being removed or separated. The crude or calcined flint, sand, quartz, or siliceous matters are also ground and 'slipped.' These matters are combined with suitable quantities of similarly prepared clay, which have been burned and crushed, and the combined plastic compound is made into bricks, tiles, and other articles in the ordinary manner."

[Printed, 3d. No drawings.]

A.D. 1856, December 20.—N° 3017.

LOOS, EDWARD. — “Improvements in the manufacture of “cement, mortar, concrete, and artificial stone.” These mortars are to be made of “a given quantity of any description of lime, “and a chemically calculated quantity of moderately fine sand “and powdered substances of a siliceous, argillaceous, aluminous, “alkaline, coagulative, and colouring nature, as well as natural “and artificial sulphates and carbonates, according as may be “required.” A proportion of “hydraulic bases” is ordinarily to be mixed with the common lime, sand, and clay which supply the principal ingredients. The lime and the fine sand or clay or other substances that combine chemically are to be reduced to fine powder and mixed into pastes, and to them fragments of the hardest materials, more or less small, are to be added. Of these mortars blocks of artificial stone can be formed, and these or other blocks may be indurated by a “chemical solution,” composed chiefly of oleaginous and resinous ingredients. The ingredients, proportions, and processes proposed to be used are described fully, but the inventor reserves “the right of varying the proportions “and thicknesses of the materials.”

[Printed, 5*l*. No drawings.]

A.D. 1856, December 23.—N° 3047.

DEHAYNIN, FELIX. — *Provisional protection only.* — Machinery for moulding bricks or other similar objects, and for expelling the same from the moulds. This machine consists of two moving wheels set vertically and gearing into each other, the moulds being on the periphery of one and projections to act as plungers on that of the other. “The substance to be moulded or pressed is “fed in over the top of the wheels, fills the moulds, and becomes “pressed or moulded by the projections on one wheel entering “the recesses in the other.” One of the wheels can slide on its bearings, and the amount of pressure which it exerts against the other wheel is regulated by weighted levers.

A moveable plate with a stem attached to it forms the bottom of each mould, and the rotation of the mould wheel brings each stem successively into contact with two cams, of which

the first elevates the plates, ejecting thereby the bricks, and the second draws them back ready to receive a new charge.

[Printed, 3d. No drawings.]

A.D. 1856, December 24.—N° 3056.

MARESCHAL, JULES HENRI ETIENNE.—Improvements in hydraulic presses, applicable, among other purposes, to the manufacture of bricks, tiles, or tubes. In these presses the moveable surface on which the water is acting is equal or nearly equal to the moveable surface acting on the substance to be pressed.

(1.) A vertical press in which moves a piston. The clay is fed on to it when at the bottom of the cylinder through an opening, which is afterwards securely closed. Water being then pumped in below the piston, the latter rises, and the clay is expressed through moulding orifices suitably fixed at the upper part of the machine.

(2.) “ The combining on one frame or truck, provided with proper wheels or rollers, of the water tank, the force pump, and the cylinder, so as to form a locomobile hydraulic press.”

(3.) The adaptation of a pressure gauge to the presses.

(4.) Allowing the piston in the cylinder, (which in the vertical press stands in the water tank itself), to fall below the level of the water in that tank when the cylinder is empty, and so permitting the use of a larger cylinder.

(5.) An arrangement, of which the main features are a bell-crank lever, and a catch on the long arm of it, for opening and keeping open the discharge valve in the cylinder when there is not sufficient pressure otherwise to keep it open; this also is made to act as a safety valve.

(6.) “ The adapting an air pump to the cylinder for exhausting the air contained in the substances in the cylinder above the piston.”

(7.) The general arrangement of a similar press, fixed also on a truck, but horizontal, and with a rack and pinion for moving back the piston after each pressure, in place of allowing it to fall by its own weight.

8. A vertical press for forcing plastic materials through a wide shallow iron sieve to free them from pebbles. The sieve enters the bottom of the press, and slides in and out on rollers, so that it

can be removed to be cleansed and refilled after each pressure. The piston is hollow, and is balanced by a counter-weight, by which it is caused to rise in the cylinder when the water pressure from above is removed.

9. An apparatus where the material to be expressed is introduced into a metal vessel, within which is a flexible bag in a collapsed state, but which, when full, will occupy the entire vessel. The hydraulic pressure is applied by pumping water into this bag.

[Printed, 4s. 4d. Drawings.]

1857.

A.D. 1857, January 10.—N° 85.

BRETHON, LOUIS JULIEN.—A machine for the manufacture of bricks, tubes, and other articles from clay prepared by the machine and expressed through moulding orifices. "The machine is as follows:—A strong vertical cast-iron screw revolving freely in the middle of a cast-iron cylinder. A rotative motion is given to the helix either by horse or steam power, and the clay is thrown with a shovel into the upper box of the cylinder as it is dug out of the ground." The screw works the clay and forces it through an iron plate drilled with small holes. The pebbles cannot pass these holes, and are swept outwards by a blade arranged for that purpose; openings being left with moveable covers, through which they can be removed. Below the perforated plate a second set of vanes, similar to the first, are fixed on the central shaft, forming a second screw, intended to force the clay downwards. Two vertical plates, revolving on horizontal axes, are so introduced through narrow apertures in the cylinder, that their wings are engaged between the threads of the lower screw, so as to prevent the clay from rotating, and to cause the pressure upon it to become vertical, and force it into a clay box, and so through the moulding orifices.

The friction between the shaft and its upper bearings being great, it is caused to run on friction rollers kept constantly surrounded with oil.

[Printed, 1s. 1d. Drawings.]

A.D. 1857, January 10.—N° 92.

PORTER, JOHN FRANCIS.—1. The first part of this invention is an improvement in the pug mill with two revolving shafts, which formed part of the invention for which Letters Patent were granted to the same inventor, 31st January 1855, N° 240, and consists in narrowing the opening between the hopper into which clay is fed and the pug mill, so that it may be only about as wide as the distance apart of the two shafts, and in fixing rollers within the hopper, to which motion is communicated, and which feed the clay into the mill. If an endless band is employed, it works on one of these rollers.

2. Apparatus for moulding clay, as delivered in a continuous stream. In this apparatus the stream of clay is caused to travel between a series of pairs of rollers, faced with a porous material, and fixed alternately horizontally and vertically, each pair being a little closer together than the previous pair, and some or all being caused to revolve, those nearest together being driven at a higher speed than the others, so as at once to compress and draw out the stream of clay, which can subsequently be cut into proper lengths for bricks. Rollers at an angle of 45°, or in other positions found desirable, may be employed.

3. Apparatus for severing the clay without stopping the machine, being a modification of that shown and described in the Specification of Letters Patent granted to the same inventor, 23rd December 1854, N° 2714, and 23rd October 1856, N° 2485. In this arrangement the bricks are severed by a wire inclined obliquely across a frame, which is moved up or down to make a cut, while at the same time it advances along the bed of the machine at the same rate as the clay.

[Printed, 11*d*. Drawings.]

A.D. 1857, February 13.—N° 424.

RICHARDSON, WILLIAM.—This invention consists of a mode of combining plates of iron or other metals with bricks, tiles, earthenware, or other substance as a lining.

1. In large tubes to be used as water mains or sewers, it is proposed to employ curved plates of metal with flanges at their edges, bolted together by the flanges into a tube having short ribs or rods projecting from its inside intended to support the lining,

and to form within it a lining of bricks, tiles, or pottery, either in contact with the metal casing, or with a space between the two; this space when left is to be occupied with non-conducting materials as a protection against frost. Also "manufacturing pottery or any other kind of clay ware in segments grooved and bevilled, so as to fit each other and form a circular tube" to be used as a lining to a metallic one.

2. For houses or other buildings; constructing the walls in a similar manner of flanged iron plates lined as before, the space between the iron plates and the lining being "filled in with concrete, cement, clay, or other earthy body, rammed in tight." Also provision for connecting rafters, door and window frames, &c. with the fabric, and peculiar forms of iron plates.

[Printed, 1s. Drawings.]

A.D. 1857, February 23.—N° 528.

KIRKHAM, JOHN.—This invention consists of—1. "Improve-ments in the construction of furnaces, ovens, or kilns for drying, baking, or burning of pottery," &c., including bricks and tiles. These kilns are built air-tight and vaulted, and the flame, smoke, or heated air drawn off from one kiln is made to pass through a second, where it serves to dry articles preparatory to their being burned. The spare heat is also caused to heat the external air admitted to the fuel, "so as to produce a more perfect combustion of the fuel than in furnaces, ovens, and kilns of the ordinary description."

2. Means of purifying the smoke and fumes given off from kilns, &c. For purification, the vapours and gases are drawn by fans or other means through "condensing vessels containing pebble stones or other suitable materials for increasing the contact surface." Water is injected amongst the stones partially to condense and absorb the gases, and to remove "soot, uncombined carbon, or other solid matters," previous to allowing the gases to escape. Lime water or other chemical agents may at times be with advantage employed instead of water.

There are also means described for collecting the fumes given off from gas works, furnaces, &c., either with a view to their purification or discharge.

[Printed, 2s. 2d. Drawings.]

A.D. 1857, February 24.—N° 546.

THORNTON, JAMES.—*Provisional protection only*.—"Improve-
ments in the manufacture of bricks, tiles, and tubes of earthen-
ware." The improvements are in machinery, which consists
of a vertical pug mill with revolving knives to force the clay down
into a duplex series of moulds placed beneath." "The two mould
tables work alternately, that is to say, each table is traversed in
turn beneath the clay cylinder, one going in with empty
moulds as the other goes out with full ones." "This action of
the mould tables is effected by an arrangement of reversing
gearing resembling that ordinarily employed in planing
machines." The moulds have open tops and a moveable piston
at the bottom of each, which, as the mould table runs out, travels
over an inclined plane and lifts out the brick.

[Printed, 3d. No drawings.]

A.D. 1857, March 2.—N° 605.

SMITH, WILLIAM HENRY, CADMAN, JAMES, and CADMAN,
JOSEPH.—*Provisional protection only*.—A method of manufactur-
ing bricks, tiles, and other articles of hollow or solid ware
from clay, shale, and other mineral substances."

"Instead of pugging and tempering the clay or other material,
and pressing it into shape while moist, it is taken direct from
the mine or heap, and such as admits thereof is cut into blocks of
suitable size, and dried for use, and these are sometimes burned
and sometimes boiled, and for certain other purposes they are
used in their green state, fresh from the mine." In general,
however, the materials are to be pulverized and moulded dry by
pressure.

[Printed, 3d. No drawings.]

A.D. 1857, March 5.—N° 647.

BURSTALL, THOMAS.—"Improved machinery for manufactur-
ing bricks and tiles from clay alone, or mixed with other ma-
terials," the whole being nearly dry and pulverized. In this ma-
chine there are two moulds side by side, in a flat mould table, each
open at top, and having a moveable plunger at bottom. The clay is
fed into two hoppers, from which it falls into two moveable feed
boxes, one for each mould, and each consisting of an open square

frame sliding over the mould table; one of these being pushed forward by the action of an oscillating lever actuated by a cam on a rotating shaft, draws after it a shutter to close the mouth of the hopper, and advances till it comes just over the empty mould, into which it drops its charge, after which it is drawn back again to receive a fresh supply.

Over the mould table runs a shaft having rotary motion, and carrying two eccentrics which work two plungers. One of these plungers enters the mould the moment the feed box is withdrawn, and commences to exercise downward pressure. The lower plunger is immediately impelled upwards by the force of steam in a cylinder, like that of a steam engine, and acting through a lever of very simple arrangement. The brick is thus at once compressed to the required solidity, and as the upper plunger rises out of the mould, a pin, to which movement is communicated from the same oscillating lever which actuates the feed box, causes the lower one to follow it and lift the brick out of the mould to a level with the mould table. The feed box now again advances, pushing before it the finished brick on to the mould table, from which it is removed by hand; and at the moment when the feed box is over the mould, the plunger is allowed to drop, leaving the mould empty to receive the next supply.

The distance through which the plunger drops is regulated by an elastic check string capable of adjustment so as to vary the quantity of clay which the mould receives at one time, and to regulate the thickness of the bricks. The two moulds discharge bricks alternately. The patentee adds, "This invention is an addition to that for which Letters Patent, dated 1st December 1851, were granted to me, and that the subject of application for Letters Patent, N^o 2071, A.D. 1856."

[Printed, 9d. Drawings.]

A.D. 1857, March 5.—N^o 654.

BOUSFIELD, GEORGE TOMLINSON.—Machinery for compressing clay and other materials, applicable to the manufacture of bricks. This invention is identical in its object with the last (No. 647), and strikingly resembles it in the methods adopted; the moulds are similar; they are filled, and the finished bricks are removed in the same manner, but the upper plungers are fixed to

the frame of the machine; and the moulds, when filled, rise up to them with the lower plungers, and the compression is completed by the lower plunger continuing to rise after the mould has become stationary. The motions are all derived from cams and an eccentric keyed on to a shaft working below the mould table. Beside "the combination of the essential parts of the machine herein described," the inventor claims,—

2. "The use of stationary upper pistons in upright machines substantially as herein described."

3. "The combination" described "of an eccentric, and a cam or cams upon one shaft to move a piston and mould box, or a piston," the machine being so arranged that the eccentric which lifts the mould frame raises the lower plungers for part of their stroke, which the action of the cams then completes.

4. "The combination of a sliding mould box with a stationary upper piston," as described.

5. "The use of a spring (or elastic pressure) interposed" between the eccentric and the mould frame in this machine in order that the mould might cease to rise whenever the compression of the clay caused it to exercise a lateral pressure on the mould strong enough to overcome the spring.

6. The use made of a slotted projection, which so connects the eccentric with the mould frame, that for some time at the beginning and end of each stroke the moulds remain unmoved while the pin upon the former is moving from one end to the other of the slot connected with the latter, and in which it works.

7. The compression of bricks, &c. "by more than two direct and steady successive pressures," which in this machine is accomplished by—

8. "The use of a cam or cams" (being those which exert an upward pressure on the lower plungers), "in which a portion of the surface is made waving, or alternately swelled and depressed, for the purpose of alternately increasing and relaxing the pressure upon the material pressed, substantially as herein described."

Suggestions are offered for variations in the machine and applications of it to other purposes besides the moulding of bricks.

[Printed, 11d. Drawings.]

A.D. 1857, March 14.—N° 730.

OATES, JOSEPH PIMLOTT.—The object of this invention is machinery for forming bricks, tiles, and other articles, both in moulds and by expressing clay through a die. It consists of,—

1. “A compound screw for collecting and propelling the “clay” or other plastic material. This screw works vertically in a cup-shaped clay hopper, with a cylindrical neck, and is itself of the shape of an inverted cone at top and parallel-sided below, so that the upper part collects the clay and the lower forces it down into—

2. “A chamber, through which the column of clay is passed, “between the feeding machinery and the moulds, and in passing ‘through which said pressing chamber the sectional area of the “column of clay is changed.”

3. “One or more escape or safety pipes connected with the “pressing chamber,” and “of a length and diameter suitable to “oppose a sufficient amount of resistance to prevent any of the “said clay escaping,” unless the die or mould are clogged. The pressure on the die can be increased by lengthening the escape pipe or pipes, or by contracting their opening.

4. Employing a perforated plate, or a series of bars close together, to close the under side of the mould, thus allowing the escape of air, moisture, or even surplus material.

5. Substituting “a series of small rollers situated in a horizontal plane” for the above perforated plate or bar.

6. “An expanding and contracting nozzle” for moulding socket pipes. The pipe having first passed through a circular die of larger diameter issues from this nozzle, and when the socket is to be formed, the segments of which this nozzle is formed are all drawn outwards, and the socket portion passes out of the full size which the inner circular die gives to it.

7. Placing tubes or collars of metal, caoutchouc, or other substance in front of ordinary collar dies to improve the surface of the pipes or other articles moulded.

8. “Placing dies for moulding bricks or other articles at unequal distances on either side of the supply of clay, so that “when the die at shortest distance from the supply of clay is “separated by a valve from a machine, the stream of clay is directed into the other die, and when the valve is opened the said

“ stream of clay passes spontaneously again into the first mentioned die,” the principle being the same as that acted upon in No. 3, viz., that the clay will escape at that point where it has least frictional or other resistance to overcome. Dies for impressing a stamp or ornament may be employed in connexion with this arrangement.

[Printed, 7d. Drawings.]

A.D. 1857, March 21.—N° 796.

HEMMING, SAMUEL.—*Provisional protection only*.—This invention relates to a new material to be employed for tiles, roofs, linings, or floors of buildings, and formed from “pulp produced from fibres of straw, grass, hemp, wood, or other similar vegetable productions,” which materials are to be manufactured by any suitable process into “surfaces,” to be subsequently rendered waterproof “by the usual preparations.”

[Printed, 3d. No drawings.]

A.D. 1857, March 21.—N° 798.

GUNTHER, GUSTAV JULIUS.—*Provisional protection only*.—This invention “consists in certain methods of cutting or moulding blocks and stones for building purposes, of such a size and shape that when formed into masonry, they shall be firmly tied and held together with or without the employment of cement.”

[Printed, 3d. No drawings.]

A.D. 1857, April 9.—N° 997.

HARLAND, JOHN.—*Provisional protection only*.—The object of this invention is machinery for expressing bricks and other similar articles through dies, “whereby a great saving of power is effected, and the clay is well purified or freed from stones or grits.”

Instead of the clay being forced through dies at the end of a cylinder or clay box by a piston, the clay is to be placed in a box travelling on rollers, and impelled against the dies. “These dies or bars are fitted to the framing of the machine, and are so disposed as to admit of the box passing along each side of them.” The lid of the box, however, which slides in grooves on the sides, is to be arrested by the dies.

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"The purifying of the clay is accomplished by forcing it through a grating of any desired degree of fineness placed either in the lid of the box or at the end thereof." This may be carried on simultaneously with the manufacture of bricks, "the fine clay exuding by the pressure upon it through the grating in the box lid, while the coarser" is expressed through the dies. See the Abstract of Specification to Letters Patent granted to the same Inventor, A.D. 1857, October 9, N° 2589.

[Printed, 3*l*. No drawings.]

A.D. 1857, April 14.—N° 1053.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from M. Errard.*)—This invention has reference to the manufacture of artificial fuel from coal dust or waste, but "the apparatus and method of operation may be applied without substantial alteration to the manufacture of other artificial fuel, and of bricks, tiles, &c., to the compression of turf and peat, to the expression of liquids, and to compressing and moulding purposes generally."

The material is first raised by an endless band carrying buckets which discharge it into a trough in which works an archimedean screw, and which conducts it into a pug-mill. For making artificial fuel these parts are kept hot by having a steam jacket, and pitch is mixed with the solid matters in the trough, which is steam-tight.

The prepared materials are conducted from the bottom of the pug-mill, through spouts, to a feeder which distributes them equally over a series of moulds ranged on a circular bed-plate. Each mould has an opening in its top through which to receive its supply of materials, and each is open at its outer end, while the end nearest the centre of the circular bed is fitted with a moveable piston. The pistons belonging to the whole of the moulds are connected by links to one central collar, which fits upon an eccentric carried upon a central shaft. The rotation of this eccentric consequently communicates a to-and-fro motion to each piston.

The portion of moulded substances caused to protrude from each mould by its piston at each revolution is cut off by a cutting apparatus and falls upon a travelling platform.

[Printed, 10*l*. Drawings.]

A.D. 1857, April 17.—N° 1091.

ARTHUR, GABRIEL.—Machinery for pulverizing clay and for moulding bricks. The clay, without previous preparation, is thrown into a cylinder slightly inclined, of which the upper part is solid, and bears sundry knives pointing towards the centre, and the lower part is of wire gauze, protected by a covering. A central shaft carries other knives working between those already referred to, and rotary motion, but in opposite directions, is given to both cylinder and shaft. The stones escape at the lower end of the cylinder; the disintegrated clay falls through the wire gauze, and is conveyed by an endless web to a clay box, and from that to the feed box of the moulding machine. For stiff clay, a pug mill may be substituted.

In the moulding machinery, open moulds, each with a loose piston, and arranged in an endless chain, pass under the feed box, and are there filled. Their contents are afterwards subjected to strong vertical pressure, the presser being depressed and raised by suitably-shaped cams on a rotating shaft. The presser has connected to it a discharger, which forces down the piston of the inverted mould brought by the return of the chain vertically under the brick being compressed. The bricks thus expelled fall on an endless band. A plunger is caused to replace the piston in the mould before filling, and two oscillating sand boxes are contrived, one to sand the mould before filling, the other to sand the brick before compression. The motion of the mould chain is intermittent, and is communicated through a lever worked by a cam, and acting on a ratchet wheel; a second ratchet wheel and catch are arranged to stop the mould and fix it at the exact spot where the plunger is to descend.

To prevent the clay from adhering to the plunger, that part of the apparatus may be made hollow and heated by a jet of steam thrown into it.

[Printed, 1s. 10d. Drawings.]

A.D. 1857, April 21.—N° 1116.

WIMBALL, HENRY.—*Provisional protection only.* — Improvements in pugmills, consisting in constructing them with two or more shafts, and sets of knives in place of using only one shaft and one set of knives. The orifice for the escape of the clay is

to be placed between the shafts, and it is preferred that its sides should be composed of rollers instead of being stationary; rollers may also be combined with an ordinary fixed opening. See Abstract of Specification to Letters Patent granted to the same Inventor, A.D. 1857, October 19, N° 2672.

[Printed, 3*d*. No drawings.]

A.D. 1857, April 29.—N° 1202.

PASCALL, CHARLES.—This invention is described as consisting in “cutting the ends of tiles by means of wires or other cutting instruments, guided and controlled.” The material of the tiles is expressed through a die in any usual manner, and travels forward on rollers to where it is to be cut off; two cutting wires do this; they are arranged so as to pass from side to side of the stream of clay, each wire directed by a pair of guides, one above and one below the rollers, so that one wire cuts and shapes the front, and the other the back of a tile. The ends of the wires are free to slide in slots in the levers that work them, so as to follow the shape of the guides. There are two such levers connected together at the front of the machine and working horizontally on points, one above and one below the centre of the tile to be shaped, so that the wires being stretched between them at equal distances, one in front of the fulcrum and the other behind it, make their cuts simultaneously and in opposite directions.

[Printed, 7*d*. Drawing.]

A.D. 1857, April 30.—N° 1219.

NEWTON, WILLIAM EDWARD.—(*A communication.*)—An improved “press” for moulding bricks, where “the clay, after being suitably dried and powdered, is thrown into moulds arranged in the periphery of a revolving wheel or cylinder, where it is subjected to a powerful pressure, the finished brick being afterwards ejected on to an endless apron, and conveyed away from the machine.”

The consolidating plunger is carried by two radial arms, each having a slot which works on the shaft carrying the mould cylinder, so that the plunger is free to rise and fall in the moulds; it is also free to travel round, accompanying the mould cylinder during a portion of its revolution. As each mould comes to the position where the plunger should enter it, a pin on the mould cylinder

catches one on the radial arm, and the plunger begins to accompany the mould, carrying with it as it does so the free end of an arm fixed to a pivot outside the cylinder, and describing an arc of a circle which would intersect the line of the cylinder. By this arm the plunger is violently forced down on the clay, and after the point of greatest pressure is passed, first the arm disengages itself, and is carried back by a weight, and then the plunger is first raised from the mould by another lever which it strikes, and subsequently drawn back to its original position by a second weight.

The brick is ejected by a piston forming the bottom of each mould, which is first protruded and then retracted by the action of suitably-shaped cams acting on a pin on the piston rod as it is carried past them by the continued revolution of the cylinder.

A second application of the same general principle is described. In this second machine, the arm by which the pressure is communicated is centred beyond the axis of the cylinder, so as to describe an arc of a larger circle within which the circumference of the cylinder would be contained, so that the plunger is, as it were, drawn down on to the clay. In this arrangement the pistons in the moulds are immovably fixed to the central shaft, and the moulds themselves are free to slide on them, and are furnished with a pin on each mould, travelling in a circular guide at the end plate of the machine and not concentric to the mould cylinder; in consequence of this eccentricity, when the brick is compressed, the mould is drawn back half as much as the plunger descends, procuring to the brick compression of both faces, and as the cylinder continues its revolution is further drawn back for the brick to be expelled, and is then advanced again to be ready for a new charge of clay.

The mechanical combinations which are shown and explained cannot be fully described in the absence of the illustrative drawings.

[Printed, 1s. 8d. Drawings.]

A.D. 1857, May 1.—N^o 1228.

BARTEAU, PIERRE ALEXANDRE, GUY, GABRIEL, and CORROY CHARLES.—*Provisional protection only*.—This invention consists in “the production of artificial stone, from iron “slag, bricks, rubble, and other hard substances of little value “broken in small pieces, and cemented together by a mixture of

“ about 20 parts of hydraulic lime, 30 parts of Roman cement, 10 parts of iron oxide or iron fillings, and 40 parts of rough plaster, mixed dry and then worked up with water to the consistency of mortar.”

Blocks may also be made of the cementing mixture alone, or of a mixture of 10 parts unslacked hydraulic lime, sifted, 24 parts Roman cement, sifted, and 966 parts plaster, mixed dry. A mould, the sides and ends of which are moveable, and in which moulded blocks can be formed if desired, is shown on the drawings.

[Printed, 6d. Drawings.]


A.D. 1857, May 6.—N° 1282.

BOUSFIELD, GEORGE TOMLINSON.—(*A communication.*)—Machinery for pulverizing clay and other substances. The clay to be pulverized is fed from a hopper into one end of a horizontal cylinder filled with perforations or gratings. Within this cylinder works a shaft, round which a number of beaters are ranged in a spiral line extending from end to end of the cylinder. The pitch of the spiral can be altered, and the size and angle of the striking surfaces of the beaters can be varied, to suit the nature of the material being pulverized. The clay as pulverized is driven through the apertures in the cylinder and collected by an outer casing with which the machine is covered. The stones and large lumps are ultimately driven by the action of the spiral arrangement of the beaters to the end of the cylinder where they escape. If further trituration is needed, the clay is made to pass between two grooved rollers. It is advanced as an advantage of this machine that the cylinder and beater are horizontal, while in other machines they are inclined, thus saving friction and wear in the bearings; also that the great cylinder is supported and driven by means of friction and driving wheels on its outside, thereby removing obstructions to the free passage of materials, &c., to the interior.

[Printed, 10d. Drawings.]

A.D. 1857, May 14.—N° 1366.

SHARROCKS, JAMES.—An apparatus for moulding and pressing bricks and tiles, &c., by hand, but which may also be worked by power.



There is in this machine a "surface plate" or table, revolving on pulleys or rollers, and having three or more moulds fixed in it. Within each mould and forming the bottom of it is a "presser plate," which "may have any device, and be mounted in leather, "gutta percha, or suitable material." A similar plate mounted above the table forms the cover to the mould. After a mould has been filled, the surface plate is moved round so as to bring it under this cover, and it is exactly fixed in position by a catch on the surface plate. The workman then, by a lever acting through cams or toothed segments and racks upon rods working in guides, depresses the cover, and causes a block to rise under the "presser plate," thus compressing the brick. On the table being moved further round for the next brick to be compressed, the mould with the finished brick comes over a second moveable block, which is worked by the same lever as the compressing apparatus and ejects the brick. Over the surface plate is fixed a brush "for cleansing, oiling, or greasing the same."

[Printed, 10d. Drawings.]

A.D. 1857, May 16.—N^o 1389.

ELLIS, JOSEPH.—Improvements in the manufacture of artificial stone. 1. This invention is described by the inventor as consisting of, "first, the manufacture of artificial stone by mixing powdered marble, shells, calcined bones, granite, porphyry, malachite, freestone, or other natural stone, or mineral, or suitable hard substance, with lime, and a solution of silicate of potash or silicate of soda, or both, so as to form a paste or plastic composition, which is afterwards moulded or shaped in moulds with or without great pressure, or spread upon walls, or otherwise employed as an artificial stone."

2. "Second, the manufacture of artificial stone by mixing together lime, and carbonate of lime in fine powder or flour, with or without the addition of other stone or burned clay, or other suitable hard substances, also reduced to fine powder or flour, and slightly moistening or damping the mixture with water, and submitting it to great pressure in moulds." Which-ever method he employed the blocks may be made, in case it is desired to imitate costly stones, of two mixtures, the body of the block being made of coarse materials, and its surface of fine

ones; these may be separated while being put in the mould by moveable plates of metal, to be withdrawn when the mould is full; or the materials may be filled in simultaneously from a hopper having two mouths; or the blocks may be made by coating the sides of the mould with the precious material, and then filling in the common into the centre. A mode of imitating the veins of stones is described.

[Printed, 5*d*. No drawings.]

A.D. 1857, May 16.—N° 1393.

BRADLEY, RICHARD, and CRAVEN, WILLIAM.—Improvements in the brick and tile machinery for which Letters Patent were granted to these inventors, A.D. 1853, July 1, N° 1583.

These improvements consist in the use of a vertical compressing piston acting downwards in conjunction with the rams or pistons contained in the moulds of the circular revolving mould table. This piston is worked from a shaft and crank of its own, and compresses each brick without stopping the moulding machinery; it consequently has to follow the mould during part of its revolution, and for this purpose travels in a curved slot that guides the piston rod, and that it may be brought back each time to the same position ready for another mould, its movements are also guided by a pin projecting from it which works in a continuous groove, approaching a circular form, in a fixed bracket plate. There is also a fork attached to the piston corresponding to a pin attached to each mould, serving exactly to guide the piston into the mould, and the piston rod has a swivel joint to allow the piston the necessary movement on its axial line while travelling with the mould table.

The machine may be modified by omitting the discharging pistons and the circular incline, and substituting under the compressing piston a plate adjusted by screws. As each mould passes the end of this plate, the brick it contains is to be discharged downwards by any suitable apparatus.

[Printed, 10*d*. Drawings.]

A.D. 1857, May 20.—N° 1420.

LETHUILIER, LAURENT.—“This invention consists in moulding and compressing articles, such as bricks, tiles, pipes, made

“ of plastic materials, as clay, peat, &c., by means of the machine shewn by the annexed drawing, the principal feature of which is the endless chain, the links of which form moulds.”

The clay is placed in a “ tub,” within which works a screw to force it downwards; there is an opening in the bottom of this tub across its whole length, and as wide as the moulds.

The mould chain, which is passed over two hexagonal rollers, travels from end to end of the machine with an intermitting motion, and the moulds of which it is composed receive their charge of clay through the opening in the tub. The moulded article, after being consolidated by a ram, is expelled by apparatus connected with one of the hexagonal rollers. The patentee specially claims,—

1. A “ hopper and recoiling sieve for sanding the moulds previous to their passing under the tub.” The sand drops into the sieve, which is free to move a short distance along an inclined plane. Each mould catches it in succession and moves it onward and upward till it rises so high as to escape from the catch on the mould, when the recoil of a spring throws it back with a jerk.

2. An endless band of velveteen or plush lined with canvas which passes over bed plates fixed under the chain, and so forms a moveable bottom for the moulds to which the clay does not adhere.

3. A cam which raises the ram as each mould comes under it, and then drops it to consolidate the brick.

4. “ All the parts of the delivering hexagon for forcing the bricks or other articles out of the moulds.” To each face of the hexagon there is a piston free to move outwards in a radiating direction, and carrying one of six rods that pass through radial slots in the end plates of the hexagon and work in guides. These guides are so shaped that each piston once in every revolution is so advanced as to expel a brick, and then retracted.

5. A crank acting through two rods upon two ratchet wheels, one at each end of the machine, by which at each revolution the endless chain is advanced by the length of one link with an intermittent motion.

6. A knife in an iron box for paring off surplus clay.

7. “ The method of placing and working a second and like machine along the first, working in the opposite direction,” and both supplied from one tub of clay.

A.D. 1857, May 22.—N° 1451.

EFFERTZ, PETER.—*Provisional protection only.*—"This invention consists in an improved method of arranging machinery for making bricks. For this purpose two quadrangular vessels are employed, in which pistons work up and down; into these vessels and on to the top of the pistons clay is fed by endless chains of buckets, and as the clay falls from these buckets it has to pass through a frame to which a rapid motion is given, and which contains a series of knives. Over the clay in the vessels frames of moulds (open both at top and bottom) are placed, and over the frames of moulds a covering plate. As the pistons rise they bring up the clay on them, force it into the moulds, and then recede; afterwards the covering plates are turned back and the frames of moulds are removed with the bricks in them. The operation is then repeated."

[Printed, 3*l.* No drawings.]

A.D. 1857, June 1.—N° 1543.

TINGLE, GEORGE.—An improvement in dies for moulding such articles as can be made from plastic materials by the pressure of two dies, one of which in working enters the other.

A conical opening tapering upwards is made in the face of the plunger or inner die communicating with a hole up the axis of said plunger. A conical plug is so fitted to this opening that when closed its face is flush with the face of the die. A stem attached to this plug rises through the hole in the axis of the plunger, and has a stop fixed on it so that the plug can drop, but only a little way. After the article is moulded and the plunger is to be withdrawn, as soon as the outer portion begins to rise the plug remains adhering to the clay, and air enters through the space between them to fill any partial vacuum, and thus renders the complete withdrawal of the die easy.

[Printed, 5*l.* Drawings.]

A.D. 1857, June 4.—N° 1577.

BOOTE, THOMAS LATHAM, and BOOTE, RICHARD.—Improvements in the manufacture of ornamental flooring, tiles, slabs, and such like articles made from clays of different colours. A thin piece

of metal cut to the form of the pattern required, and with a rim made to project above its surface to a height equal to the depth to which it is thought necessary to insert the design, is laid in the mould and the coloured clays are filled into it. The clay for the body and ground colour of the article is filled in behind the other, and the whole is compressed till it becomes united. A second pressure in a plain mould obliterates the incised lines left by the rims of the metal pattern.

In forming moulds for elaborately ornamented articles the part which is to shew the ground colour is made to rise by springs or other means to a distance equal to the depth which it is thought necessary to give to the ornament. The coloured clay is filled into the hollows thus formed, and the clay for the body of the article filled in behind it. The whole is then subject to a pressure, under which the springs give way till the ground clay is forced around the coloured clays, "which are thus imbedded in the " ground or body of the article to the same depth as that to " which the parts of the mould were raised."

[Printed, 3d. No drawings.]

A.D. 1857, June 10.—N° 1627.

GORSE WILLIAM, and POLLOCK, SAMUEL. — *Provisional protection only.* — This invention consists of machinery for the moulding of bricks or other articles. The moulds, which have moveable bottoms, are fixed on the periphery of a wheel turning in a vertical plane. The clay is delivered into the moulds from a hopper, and each in its turn is subjected to pressure from a plunger acted upon by a piston in a steam cylinder. The bricks are afterwards expelled by pressure upon the bottom of the mould. The machine is to be self-acting, and all its parts driven by the steam cylinder.

[Printed, 3d. No drawings.]

A.D. 1857, June 20.—N° 1737.

FLETCHER, CHARLES. — *Provisional protection only.* — This invention is applicable to brick-making machines, and " consists " in adapting to the feeding part of the machinery a roller or " rollers provided with sliding pallets which move radially from

“ and to the centre or axis of the rollers as the latter rotate in their bearings.”

The mechanism actuating this radial movement is to be capable of easy adjustment, and the object of this movement is to press forward into the moulds the clay which has already been supplied to the feeding channel.

[Printed, 3d. No drawings.]

A.D. 1857, June 24.—N° 1761.

MALLETT, ROBERT.—The patentee describes his invention as being, “ first, the manufacture and application to the covering of “ buildings of ‘ buckled ’ tiles, or tiles which are convex in both “ directions, of metal, glass, or other suitable material, having “ edges or ribs projecting upwards on the upper portions, and “ downwards on the lower portions of the tiles (with reference to “ their position when employed on a roof), and adapted for being “ placed more or less diagonally on a roof or side of a building, as “ herein-before described.”

“ Second, the manufacture, and application to the covering of “ buildings, of tiles, with edges and corners of the forms shewn “ in the Drawings,” that is to say, similar to the edges and corners of those first described, but corrugated, ribbed, or even flat, instead of buckled.

[Printed, 1s. 11d. Drawings.]

A.D. 1857, June 25.—N° 1778.

BOURRY, ERNEST AUGUSTE.—*Provisional protection only.*—
“ Improvements in kilns or ovens for burning or baking bricks, “ tiles, and other earthen or ceramic matters.” The kiln is to be built of a circular form with one entrance and a furnace opposite that entrance; and a set of radial partitions is so fixed as to divide the kiln into compartments, and is made capable of being moved round therein on a central pivot, each compartment being in its turn filled with unbaked articles, and the whole moved round one step at a time, so that each compartment gradually approaches the furnace, reaches it, and then gradually recedes till it comes round again to the entrance, where it is emptied and re-filled: so as to secure that “ while the matters are contained in the

“ kiln or oven, they shall first be gradually warmed or heated, and
“ subsequently completely burned or baked, and afterwards gra-
“ dually cooled before being removed from the oven.”

[Printed, 3d. No drawings.]

A.D. 1857, July 2.—N° 1837.

DANCHELL, FREDERIC LUDWIG HAHN, and KIMBER, HENRY.
—(*A communication from Carl Buring.*)—*Provisional protection only.*—The object of this invention is “ the manufacture of fire
“ and water proof bricks, plates, &c.” and the invention consists
in employing carbonized substances either alone or mixed with
bituminous matter, and compressing these materials in a warm
and dry state into the forms required. If requisite, the articles
so manufactured are to be baked in ovens.

See abstract of specification of Carl Buring, 31st December
1857, N° 3194.

[Printed, 3d. No drawings.]

A.D. 1857, July 17.—N° 1980,

BARLOW, CHARLES.—(*A communication.*)—*Provisional protection only.*—“ An improved brick machine composed of two endless
“ chains, one above the other, stretched round, and set in motion
“ by octagonal wheels,” moved by a hand shaft. The links of
the lower chain carry brick-moulds open at the top, those of the
upper chain carry compressing blocks, and the moulds being first
filled by passing under a clay-box, their contents receive pressure
from the blocks carried by the upper chain, support being afforded
to both chains by friction rollers.

[Printed, 5d. Drawings.]

A.D. 1857, August 13.—N° 2159.

BOSWORTH, JOHN ALLEYNE.—“ This invention has for its
“ object improvements in machinery for grinding and crushing
“ brick earth,” and it “ consists of crushing clay by means of
“ rollers on surfaces made up of bars, having narrow spaces
“ between them.” It is proposed to crush the clay on an annular
platform or track, composed of sections bolted together, and
carrying iron bars placed side by side, and in a radial direction;

the width of the slits between the bars being determined by the fineness of the grinding required. "Edge stones or runners" roll round on this platform; they are so connected by arms to a central axis which receives rotary motion from the prime mover as to be free to rise or fall. There is a conical incline within the platform, so that all clay thrown there may fall under the rollers, and the material to be ground is to be continually shovelled or otherwise fed on to the circular track, and the runners as they roll continually force it through the spaces between the bars.

[Printed, 6d. Drawings.]

A.D. 1857, September 26.—N° 2484.

LEWIS, JOSEPH.—The machinery for making bricks and other articles from pulverized clay or other material by direct steam pressure which forms the subject of this invention is an improvement upon the invention for which Letters Patent were granted to Weston Grimshaw and Ellis Rowland, 7th Sept. 1853, No. 2060. These improvements are, 1. The addition to the machine of two extra steam cylinders, of which one gives preliminary pressure to the contents of each mould before it reaches the main grinder, while the other causes the pistons to rise and expel from the moulds the finished brick. All these cylinders to be supplied with steam through a steam valve worked by a peculiarly formed cam.

2. Arranging the moulds in groups in the mould-table so that two or more bricks may be moulded at each rise of the steam-piston.

3. "Mechanism for imparting an intermittent motion to the table containing the moulds which is effected by means of a "star wheel" and a cam or cams, or wheel gearing therewith." Also an apparatus called a "sweeping chain," being two short parallel endless chains connected by bars at intervals, and working on two rollers, in such a position that as the filled moulds with the bricks lifted to their tops come round, the bars shall sweep the bricks off on to an endless cloth or web.

4. A moveable knife or slicer introduced between the feed hopper and the mould table, and intended to close the hopper, except at the moment when an empty mould is presented under it to be filled. "Also the self-acting apparatus for effecting the

“ necessary motion of the said knife at proper intervals,” which apparatus can be best understood from the drawings.

5. Machinery for disintegrating clay by forcing it to pass between a revolving plate or disc thickly covered with projecting studs or pins and a fixed plate similarly covered with studs.

[Printed, 1s. 7d. Drawings.]

A.D. 1857, October 1.—N^o 2522.

JENNINGS, JOSIAH GEORGE.—Improvements in articles used for forming flues, and air or water passages in buildings. 1. As a substitute for ordinary wood trimmers, to carry flooring at the front of five openings, employing cast-iron trimmers, with sockets to receive the joists, and air openings in the spaces between those sockets, and using in combination with them hollow blocks of earthenware forming air-flues.

2. Hollow blocks of earthenware, made by expressing clay through moulding orifices, which shall in the interior present a suitable space for a smoke flue, surrounded with hollow spaces for air flues. Each block may be in one or two or four pieces, but “ when such blocks are made in two or four pieces, then each piece is made in such form as to contribute to the formation of the inner or central smoke flue, and also contribute in the formation of one or more air flues in contact with the inner or smoke flue,” and “ it is preferred that the ends of these blocks should be made with grooves to facilitate the making of close joints.”

4. “ Hollow blocks of earthenware, with passages through them suitable for rain water pipes, and also for air flues to ventilate the drains into which such pipes enter.” These blocks, like those forming the subject of the second part of this invention are adapted to be built up along with ordinary brickwork. The blocks can be made with one or both ends cut off obliquely to accommodate cases where the flues have to be carried in a slanting direction.

[Printed, 10d. Drawings.]

A.D. 1857, October 9.—N^o 2589.

HARLAND, JOHN.—“ This invention relates to a peculiar construction and arrangement of machinery, or apparatus for cleansing or purifying clay, and for making bricks,” &c.

In this machinery the clay is placed in a travelling box running on antifriction rollers, and is forced against bars or a fixed grating, which will not allow impurities to pass through its interstices and which shall nearly fill the transverse section of the clay box. The lid of the box being attached to the grating by a hinge, the box itself is free to move forward past the grating, thus avoiding any loss of power from the friction of the clay against the sides of the clay box.

A contracting mouth-piece to mould the clay into a form suitable for cutting into bricks, &c. may be fixed in front of the purifying grating, and compressing rollers to smooth and consolidate the clay as it issues from such mouth-piece may be added. The purifying gratings may be fitted in various ways to the clay boxes, as, for instance, they may be fitted into the lid or the inner closed end of the same. In the drawings two boxes are shown arranged to be fed from one hopper in the centre, and to discharge clay alternately from either end of the machine.

[Printed, 10d. Drawings.]

A.D. 1857, October 10.—N° 2601.

PORTER, ROBERT, and PORTER, JAMES.—Machinery for the manufacture and pressing of bricks.

In this machine the moulds, of which there must be some even number, as for example four, are ranged in pairs round a central horizontal spindle; they are open at the mouth and are fitted with moveable bottom plates, those of each pair being so connected that when the plate belonging to one is depressed to the full, that belonging to the corresponding mould is caused to rise to the mouth of the mould. The clay is cut into lumps of about the size of a brick by hand, and one of these having been forced by a plunger acting horizontally into one of the moulds and there consolidated, the series of moulds is then caused to make so much of a revolution as will bring a fresh mould opposite the plunger, and bring the one last filled into an inverted position, upon which its contents are discharged downwards, its bottom plate being driven up to its mouth by the depression of the plate belonging to the connected mould. This depression is given by a sand and oil box, which descends into each mould in succession immediately previous to its being moved into the position for receiving its charge, serving to force the bottom plate of the mould down and to sand it, and

at the same time to lubricate its sides with oil. The face of the plunger and that of each bottom plate carries a projection to form follows on two sides of each brick.

The machine may be mounted on wheels—it may be actuated by either steam or hand power, and it may be either single or double, *i.e.* either with one plunger and one set of moulds, or with two.

[Printed, 1s. 1d. Drawings.]

A.D. 1857, October 19.—N° 2672.

WIMBALL, HENRY.—This invention embraces the one for which provisional protection was granted to the same inventor, A.D. 1857, April 21, N° 1116, but in addition it is proposed that the clay may be run into moulds on carriages, being an improvement upon the mould carriages forming part of the invention, for which Letters Patent were granted to the same inventor, A.D. 1856, December 12, N° 2954. It is now proposed to fix to these carriages moulds open at the sides and top, and to pass them between and under rollers or metal plates which shall smooth the surfaces of their contents. The bottom of each mould is a moveable plate to be taken out by hand with the brick on it, and subsequently replaced. The mould carriages are to be propelled forward by the machine. Endless chains carrying moulds may be substituted for these carriages.

A modification is described in which a pug-mill with two shafts expels a continuous stream of clay laterally through a moulding orifice. Each shaft, besides carrying pugging blades, is furnished at the bottom with “flanged wheels having apertures in their flanges, and having inclined cutting knives or blades formed thereon, for the purpose of more readily directing the clay “towards the die.”

The application to brickmaking of pug-mills having at the bottom an opening for the free passage of a series of moulds, the clay being forced directly into them, is specially claimed by the inventor.

[Printed, 10d. Drawings.]

A.D. 1857, October 31.—N° 2773.

WOODHEAD, WILLIAM, WOODHEAD, JAMES, and WOODHEAD, JOHN.—*Provisional protection only.*—“Improvements in
B. & T. o

" the manufacture of kiln tiles." Instead of forming hollows in the back of these tiles, with a perforation in the centre of each hollow, by two separate processes, and by hand, the tile is by this invention first formed plain in a mould that has on one side a perforated plate, and a series of projecting instruments, each carrying a pin or point in its centre are then pressed at one operation through the perforations of the plate into the clay, and form the required cavities and holes. "The tile thus formed is then lifted out of the mould by means of a lever operating upon a loose or false bottom."

[Printed, 3d. No drawings.]

A.D. 1857, November 10.—N^o 2337.

ROWCLIFFE, THOMAS.—1. A machine for pugging clay and expressing the same through moulding orifices. This machine consists of a pug-mill fixed vertically; and having above the usual blades a wheel set on the central shaft with flat arms arranged to act like an archimedean screw. The clay passes from the pug-mill into a horizontal chamber fixed below the mill, with a piston working in it, to which a reciprocating motion is communicated, consequently the clay is expelled through dies at the two ends of the chamber alternately. Hollow perforated rollers into which water is introduced, are fixed in the interior of the dies to lubricate the clay. "The interior angles of the die are filled in and so formed that they rise higher at the interior than they do at the outlet." The moulded stream of clay is received on an endless web or cloth and cut into lengths by wires.

2. A modified machine in which the clay is first crushed between two crushing rollers, and from them is fed into a pug-mill placed horizontally, from which it is expelled in a continuous stream through a die.

3. A machine for compressing bricks or tiles made by hand moulding or otherwise. The clay articles are to be placed upon a horizontal rotatory table to which intermittent motion is given, and which brings each one successively under a box or mould which descends upon and consolidates the article. "The interior of this mould is made of steel plates, or other suitable metal, capable of being removed when worn by labour and new plates substituted."

4. An apparatus capable of being appended to either of the first two forms of machine and consisting of a frame containing a series of brick moulds, which can be traversed to and fro, with a roller so placed as to indent the surface of the clay in the mould. Several of the various parts and movements combined in these machines, and more or less clearly shown on the drawings and described, are also separately claimed by the inventor.

[Printed, 1s. 3d. Drawings.]

A.D. 1857, November 27.—N° 2958.

WRIGHT, SAMUEL BARLOW, and GREEN, HENRY THOMAS.—This invention has for its object the improvement of that class of machines where a stream of clay is expressed through a moulding orifice, and subsequently cut into lengths; it consists in,—

1. Regulating the speed of the cutting apparatus by the speed at which the clay is being expressed. This is accomplished by connecting the apparatus “by means of cog wheels or otherwise “with one of the rollers or drums around which the endless “band turns, which receives the stream of clay as it comes “from the orifice of the pug mill.”

2. An improved apparatus for cutting the stream of clay into lengths. This consists of a wheel kept in place by bearing pullies, and having spokes, in each of which the portion attached to the periphery is of wire, and acts as a cutter, the central portion being of elastic wood. The wheel is fixed at such an angle to the stream that its spokes would cut the lower edge of the clay at a right angle, allowing for the forward motion of the clay while the cut is being made, and a guide is so fixed as to bend the upper part of the wire and cause it to take a similar path, so as to cut the clay vertically. The clay is supported while being cut by a frame with moveable sides, held in place by springs, but yet capable of giving way should stones or roots in the clay be dragged out by the wire. This frame and the pallets which support the clay are kept moistened with water.

[Printed, 10d. Drawings.]

A.D. 1857, December 2.—N° 2989.

ECCLES, JOSEPH.—This invention relates to “improvements in “drying and colouring, or ornamenting bricks, tiles,” &c., consisting in,—

1. For drying the articles previous to burning, the use of "a series of pipes or channels, one or more of which is supplied with air by mechanical means, the other being heated by "hot water, hot air, or steam;" or when the floor of the drying room is heated by flues, the use of perforated pipes alone, in either case the pipes being protected by a perforated cover or guard constructed to allow a free passage of air, but to prevent the articles from coming into absolute contact with the pipes. Also ceiling the room where this process is carried on with canvas or some other absorbent material which will take up the vapours given off.

2. Employing fire-brick earth and pipe clay in the colouring or ornamenting of articles made from plastic materials, as the basis of a colour which is to be applied to the articles before they are burned; suitable colouring matters to be mixed with these substances if needed.

[Printed, 8d. No drawings.]

A.D. 1857, December 12.—N° 3067,

PRÉAUD, JEAN MARIE.—(*A communication.*)—An improved engine with rotary piston working in an annular chamber, applicable as a steam engine, or for obtaining motive power by means of the elastic pressure of other vapours or of liquids, and also as a pump, or as a clay expressing and moulding machine. The chamber of this machine is a hollow ring, and it has a piston connected by a thin disc of metal to a central shaft, and exactly fitting this hollow ring. An inlet and an outlet opening are made in the annular chamber near together, and the space between them is interrupted by a circular stop so arranged, and set in motion that at the moment when the piston has completed a circuit of the ring, it shall be permitted to pass, but that at all other times the separation shall be complete. This is effected by the circular stop having a cavity in it, and receiving rotary motion at the same pace as that of the piston, so that at the moment when the piston reaches the stop the cavity shall present itself and allow it to pass.

[Printed, 10d. Drawings.]

A.D. 1857, December 31.—N° 3194.

BUHRING, KARL.—The manufacture of various useful articles, including bricks, from a combination of carbonized or carbonizable with other materials. Carbonized animal or vegetable materials, or any such material as, by the action of heat may be carbonized, are to be reduced to powder and mixed with, from one third to one tenth of pitch, asphalte, sugar, wax, or any other bitumen, rosin, or gum, also in a powdered state. For fire and water proof bricks and other articles a proportion of mineral matters such as fire-clay is to be added. This mixture is to be put warm into metal moulds and pressed, and the articles so moulded are to be enclosed in an earthen, brick, or other convenient case packed in lime so as to be air tight, heated to a white heat and permitted slowly to cool.

This appears to be the same invention for which provisional protection was granted to Duchell and Kimber, 2nd July 1857, N° 1837.

[Printed, 3d. No drawings.]

1858.

A.D. 1858, January 22.—N° 120.

BASFORD, WILLIAM.—This invention comprises improvements in kilns or ovens, and in the mode of charging them. 1. In circular ovens, where the flues under the floor converge towards the centre, every alternate one is to be covered with perforated tiles, and a circular flue is to be formed round the interior of the oven, also covered with perforated bricks, and communicating with all the fire passages, the object being to secure a more equable diffusion of heat.

2. Carrying the flues or fire draughts under the floor of a circular oven in parallel lines, across the oven from side to side, and forming transverse passages to connect them, and building chambers over them, in which the most delicate portion of the articles to be burned can be placed, the remainder being placed above the chambers.

3. Building square kilns with a similar arrangement of flues and chambers to that described under No. 2, and domed at the top. For burning glazed bricks, the side walls of these chambers

may be constructed of perforated bricks, to admit the fumes of the salt. A mode of using perforated bricks in kilns, which formed part of an invention, for which Letters Patent were granted to the same inventor, January 20, A.D. 1844, N° 10,020, is here disclaimed as not new.

4. Forming the cone or dome of a kiln with a set-off at the base, to narrow the top of the oven, and with several openings just below the top, furnished with stoppers, by closing which the heat may be directed and regulated. These holes are also used for introducing lumps of coal to strengthen the heat.

5. Improvements in pottery kilns, which are built circular, with heat flues radiating from the centre, and chambers for the goods.

6. Making bricks, wherewith to construct chambers in the above kilns from a combination of fire-clay and flint chippings, or calcined flints, broken small and sifted. Rough "refractory" sandstone coarsely pounded may be used.

7. A novel mode of charging ovens or kilns, to avoid injury by the piling up of the articles to a great height above one another. Low temporary walls are to be built in the kiln, and articles placed between them till the height of the walls is nearly reached, then "tie or cross bricks" are to be placed extending from wall to wall, and on them, as a floor, a second series of goods to be burned may be placed, the weight of which will thus not be borne by the lower articles. The temporary walls may be built of bricks requiring to be burned.

[Printed, 1s 2d. Drawings.]

A.D. 1858, March 8.—N° 470.

DOULTON, HENRY.—This invention has for its object the formation of blocks, suitable for building smoke and air flues, and for bonding in with ordinary brickwork. These blocks are manufactured by expressing suitable clay or brick earth through dies; through each one there runs a passage either elliptical, cylindrical, or of other suitable section for the smoke flue, and a narrow passage to form an air flue following the line of the smoke flue. This air flue is rectangular on three of its sides, and, by preference, curved on the fourth. At each junction a lip is worked on the block to keep the smoke and air flues separate, and projections are formed fitting into corresponding hollows in the next block. For building inclined flues, blocks are manufactured with

oblique ends, and blocks with openings are also made, which openings can be fitted with valves, and form communications between the air flue and the rooms.

[Printed, 5*d*. Drawings.]

A.D. 1858, March 20.—N° 589.

PITMAN, JOHN TALBOT.—(*A communication.*)—This invention consists of “improvements in preparing and moulding clay into “bricks, tiles, pipes, and other similar manufactures.” The clay is first crushed by passing between two rollers revolving at unequal velocities, and then passed through an ordinary pug mill, on leaving which it traverses a channel, whose inner surface is composed of a large cylinder, revolving on a vertical axis, while the outer one is formed of a series of smaller revolving cylinders, with elastic guard plates between them. The clay then passes into and through a “forming die,” where it is cut into lengths.

The article thus made has a fine surface, adapted for being enamelled.

[Printed, 3*d*. No drawings.]

A.D. 1858, March 23.—N° 608.

PETERS, EDWARD.—*Provisional protection only.*—“This invention has for its object improvements in burning bricks and “other articles, made of brick earth and clay. For these purposes, “the bricks or other articles to be burned are placed on wagons, “trucks, or sledges, which run or slide on rails, and are caused “to pass slowly through a kiln.”

[Printed, 3*d*. No drawings.]

A.D. 1858, March 26.—N° 643.

DOULTON, HENRY.—The object of this invention “is to make “the ends of invert blocks, whether for making or for lining the “lower parts of sewers or drains, so that part or parts projecting “from the end of one block may enter into a hollow part or parts, “and bond with the next block.” These blocks are to be made by expressing clay through suitably shaped moulding orifices, and to one end of each before burning, a projection or projections are affixed, while a corresponding opening or openings are made in or through the other end; space being left to admit of cement

being run in to make the joint more close when the blocks are laid in place.

[Printed, 3d. No drawings.]

A.D. 1858, April 17.—N° 840.

JENNINGS, JOSIAH GEORGE.—The object of this invention is “to introduce hollow blocks not only for the inverts of sewers, drains, and arches, but also for constructing the sides and “upper parts,” and to improve the manufacture of blocks suitable to such purposes. Invert blocks and blocks to be used for the sides or crown of sewers, &c. are to be formed by expressing the clay through moulding orifices, they are to be hollow, and that face or wall of them which forms the sides and bottom of the sewer may be thicker than the other faces, but lightened by numerous small perforations running lengthways. The surfaces where the blocks bear upon one another are either corrugated, so that two blocks brought together will interlock, or they are arranged to receive small tubes or locking pieces which will act like a kind of continuous joggle. The blocks may be grooved at the end that their heading joints may be run with cement. To provide for junctions into sewers, &c., when they may be required, blocks are made with the side partially perforated in one part, “so that by blows of a mallet or other instrument an opening may be readily made through.” Blocks for the construction of floors or flat arches may be made in a similar manner.

[Printed, 10d. Drawings.]

A.D. 1858, May 4.—N° 992.

NEWTON, WILLIAM EDWARD.—(*A communication.*)—This invention relates to applying to the moulding of bricks and other analogous articles portions of an apparatus for moulding materials for the manufacture of fuel for which Letters Patent were granted to the same inventor 20th March 1858, N° 587.

The materials are thrown into a hopper and fed by the action of an archimedean screw into an endless chain of buckets, which raise them to the top of a large vertical pug-mill where they are prepared, and from whence they are discharged through an orifice at the bottom of the mill into the moulding apparatus. This apparatus consists of a circular table carrying four moulds, each with a loose

piston or plunger below it, and having an intermitting rotary motion, so as to leave the moulds stationary at each time of filling, compressing, or discharging. A mould having been filled, the next step carries it under a strong fixed upper plate, and while it is stationary under this plate its piston is forced up from below by the action of one arm of a double acting lever, set in motion by the force of steam in a small cylinder. When the mould reaches a position exactly opposite to that at which its contents are thus consolidated, the other arm of the lever acts upon its piston a second time and expels the brick.

Instead of four single moulds the table may be made to hold four groups of moulds so as to make two, three, or more bricks at each motion of the piston in the steam cylinder.

[Printed, 1s. 9d. Drawings.]

A.D. 1858, May 10.—N° 1042.

FORSTER, WILLIAM CHARLTON.—This “invention consists of “the production of a vitrified substance in the interior of bricks “or slabs, whereby the outer surfaces remain unglazed and adhesive, and the absorption of water or damp from the lower “surface to the upper surface is prevented.” The material for these bricks is about three parts fire clay to one of burnt clay or broken pottery roughly powdered, and of this the bricks are to be moulded in two such halves, that when placed on one another they shall form an ordinary brick; a layer a quarter of an inch thick of “vitrifying mixture composed of about three equal “parts of sand, or powdered glass, or powdered flint, and one “equal part of lime,” worked with water to the consistence of mortar is then to be laid on the top of one half, and the other half is to be applied upon it, and the brick thus built up is to be burned at a heat great enough to vitrify or fuse the mixture. If the clay employed be not fire-clay, or such as will stand so extreme a heat, then some such fluxing material, as is used in the manufacture of glass or enamel, may be added.

[Printed, 3d. No drawings.]

A.D. 1858, May 12.—N° 1067.

MARK, WILLIAM.—*Provisional protection only*.—“Improvements in roofing and other tiles.” 1. Manufacturing roofing

tiles each with a rib along one edge, and a channel or groove along the opposite edge, but on the reverse side, so that the ridge on one tile may, when they are laid on a roof, fit into the channel in the adjoining one. Each tile has also a hollow on its under side, extending part of the way up from its bottom edge, to receive and cover the rib at the junction of the two tiles that would lie immediately under it when fixed on a roof.

2. Manufacturing tiles intended for use as guttering or spouting, double, i.e. with an outer and an inner shell, having a space between them. A portion of the outer shell is cut away at one extremity and of the inner shell at the other extremity of each—thus forming two rebated ends which, when brought together and secured with cement, form a tight joint.

[Printed, 3d. No drawings.]

A.D. 1858, May 22.—N° 1154.

CLARK, WILLIAM.—(*A communication from François Pollard.*)—*Provisional protection only.*—Improvements in machinery or apparatus for moulding paving blocks, or squares, flags, bricks, and various other articles from cement. “Plain articles, or those which can be expressed from a mould, are conducted into a mould frame, which shapes them. When shaped and solidified they are taken out of their respective moulds by means of a machine of simple construction.” Pipes are made in a hollow mould, having for a core another tube with a longitudinal hinge and moveable axis. This axis being removed allows of the core being withdrawn; the pipe is then taken out of the exterior mould.

[Printed, 3d. No drawings.]

A.D. 1858, May 26.—N° 1176.

LUIS, JOZÉ.—(*A communication.*)—This invention relates to “an apparatus for baking fire-brick clay.” This apparatus can be of any size up to a capacity of 45 to 48 feet sectional area, and it consists of a low vaulted chamber in which the clay is baked, with flues from the furnace to carry the heat under the floor of the chamber, and an escape pipe, to reach which the hot air, &c. has to return through or over the body of clay. The apparatus can also be used for baking sand.

[Printed, 1s. Drawings.]

A.D. 1858, June 7.—N^o 1282.

VIGERS, EDWARD.—This invention relates to improvements in the material from which bricks and other articles can be moulded, and consists in mixing with clays of various descriptions, certain proportions of an “anhydrous silicate of allumina” obtained by calcining and pulverizing the refuse “resulting from the employment of the Torbane mineral, and such like mineral in the “manufacture of carburetted hydrogen gas.” The inventor states in detail the proportions in which it is advisable to employ this material in combination with certain clays, for certain purposes, as with china or pottery clays for earthenware and china, with London or other clay alone, or mixed with road scrapings or with chalk for ordinary pale and red bricks, or for fire-bricks, and, with the addition of a portion of old fire-brick materials, for very refractory fire-bricks. Clay which, when used alone is unfit for the manufacture of sound bricks, will be rendered serviceable by the admixture of this material.

[Printed, 4d. No drawings.]

A.D. 1858, June 8.—N^o 1292.

BUNNETT, JOSEPH.—This invention has for its object an improved construction of floors, roofs, and arches, formed of hollow earthenware or clay blocks made by “expressing clay through “moulding orifices or dies,” and which form when put together a very flat arch, springing from angle plates or other suitably shaped plates of iron, resting on the walls and securely tied together by iron tie-rods, at proper intervals, which rods it is preferred should pass through the hollow blocks of earthenware. The form of the blocks may vary somewhat, but it is recommended that they should have their opposite sides parallel, each side having a kind of zig-zag section, composed, as shown on the drawing, of two parallel inclines and a nearly straight portion; the ends where the blocks of a rim or arch abut against one another to have the same section or some other form that will enable them to fit into each other.

[Printed, 6d. Drawings.]

A.D. 1858, July 3.—N° 1502.

JENNINGS, JOSIAH GEORGE.—"Improvements in air bricks, " and in bricks for bonding hollow walls." The air bricks are to be formed of clay or brick earth expressed through a moulding orifice or die, and are to have numerous perforations running horizontally through them. They are made to correspond in dimensions with other bricks, but may be of various lengths and may be of a size to bond with one or with more than one course of brickwork. The bricks for bonding hollow walls are to be similar in material and process of manufacture, they are of lengths corresponding to the thickness of the intended hollow wall, or to so much of that thickness as it is requisite to bond. Each brick is made with vertical passages through it, and has projections and grooves at its sides while its bedding faces have hollows sunk in them in order to prevent moisture from flowing from one wall to the other, and "the edges of each end of the brick are jagged so " as to hold, when laid, the external and internal walls more " firmly together."

[Printed, &c. Drawings.]

A.D. 1858, July 7.—N° 1519.

SMITH, WILLIAM ALLEN.—Machinery for making bricks, tiles, or pipes of clay in moulds, forms the subject of this invention. A pair of clay rollers, or some other appliance, is employed to force clay downwards through a small channel, and a frame with two sets of moulds, is caused to slide to and fro over a closely fitting moulding table, and under this channel, a pause occurring after each traverse of the mould frame, and during these pauses the moulds of the one or the other set are filled alternately. The full set of moulds have been meanwhile carried under a set of pistons, which are caused to descend upon them, and force out the bricks, and which, immediately they have done so, are raised again by the action of a spring.

The intermitting to-and-fro motion is communicated to the mould frame by two bell-shaped or double acting levers, caused to oscillate by a crank; these levers also actuate the pistons for expelling the bricks; or the motion may be communicated by two pullies on one of the main shafts, working in opposite direc-

tions, with self-acting means of alternately shifting a strap, conveying motion to the frame, from one to the other of them at the proper time.

A modification is described in which the moulds, each one having its own moveable piston, are linked into an endless chain, and passed over two octagon rollers, which carry them under the clay channel, they being guided close to its mouth by a rail. After being filled, these moulds pass between a roller, which forces up their pistons and a fixed surface, so that their contents are compressed. In returning with their mouths downwards, their pistons are a second time caused to rise, and the bricks are thus expelled.

This invention also includes "the using of flannel or other analogous material, to cover the pistons used in brick machines."

[Printed, 1s. 5d. Drawings.]

A.D. 1858, July 12.—N° 1566.

TAYLOR, JOHN. — *Provisional protection only.* — "Improvements in the manufacture of blocks for the construction of sewers, drains, and arches." These blocks are to be made by expressing clay or brick earth of the best description through dies, and may have longitudinal passages. Their inner surface is concave, of a curvature regulated by that of the intended structure, and the outer surface of each block bears a rib, agreeing in section with the sizes of the bricks to be used along with it. In use one of these blocks is to be placed in one of the moulds such as now used, and the vacant spaces in the mould, *i.e.*, those on either side of the rib at the back, are to be filled in with bricks, and cement run in as usual. See Abstract of Specification to Letters Patent granted to the same Inventor, A.D. 1858, August 17, N° 1803.

[Printed, 3d. No drawings.]

A.D. 1858, July 26.—N° 1683.

JONES, EDWARD.—1. The first portions of this invention have reference to improvements in drains and drainage.

2. A "compound brick machine," consisting of a pug mill, with two outlets for the prepared clay. That issuing on the one side enters moulds in the upper side of a horizontal mould wheel, each one having a moveable piston below. As each of the moulds

is successively filled, and its contents consolidated by pressure from above, the progress of the wheel carries the pistons forming its moveable bottom over an inclined plane, which causes it to rise and dislodge the brick.

The stream of clay issuing on the opposite side escapes through a moulding orifice or orifices, and is cut into lengths or blocks, which are subsequently compressed in a vertical moulding machine.

[Printed, 1s. 11d. Drawings.]

A.D. 1858, July 31. —N° 1732.

PERCY, WILLIAM CARTER STAFFORD.—*Provisional protection only.*—1. Fixing the cylinder of a pugging and screening mill horizontally instead of vertically.

2. Employing an endless belt or apron to convey prepared clay or brick earth from such a mill to the moulding machine.

3. Partly drying prepared clay by a current of air produced by mechanical means.

4. Combining with a pugging and screening mill a pair of expressing rollers.

5. A combination of these rollers, the first and second fitted to express plastic material through moulding orifices, the second and third to force it into a chamber leading to mould boxes on an oscillating table under said chamber.

6. A doctor or doctors, or damper, to regulate or entirely cut off the supply of material fed from rollers to a moulding orifice.

7. Combining such cutting off doctor or doctors with the mechanism for dividing the moulded material into lengths.

8. Making the clay cylinders or boxes of piston-machines of an oval form in place of rectangular, for greater strength.

9. " Lubricating plugs" for making indentations in articles formed of plastic material.

10. Making such plugs hollow and with pistons.

11. Moulding articles from two different plastic materials, each material being forced forward by a separate apparatus, and the two streams coming together just before passing through the die.

12. A tube with a wire across its mouth to be used for forming hollows in articles of plastic material.

13. Portable moulds and cores filled at a machine.

14. Combining Nos. 1, 2, 5, 6, into one complete machine with or without Nos. 3 and 7. Also a similar combination, but substituting an horizontal pugging roller for No. 5.

[Printed, 3*d*. No drawings.]

A.D. 1858, August 17.—N^o 1803.

TAYLOR, JOHN.—1. The first part of this invention is the same as that for which provisional protection was granted to the same inventor, A.D. 1858, July 12, N^o 1566.

2. In making curved blocks for the construction of a sewer by the use of several bricks introduced into a mould and then run with cement, constructing them of two layers of bricks, whereof the upper layer shall overlap the under at one end and one side, and fall short of the under layer at the other end and side, thus securing that the blocks when built up together shall overlap and support each other. These blocks may be formed partially of common bricks, and partially of shaped lumps, such as described in the first part. "Also similar forms of blocks may be made by "expressing clay through moulding orifices, the sides overlapping "as above explained, and when cut into suitable lengths the ends "may be so cut as to overlap."

[Printed, 8*d*. Drawings.]

A.D. 1858, August 9.—N^o 1810.

CLAYTON, HENRY.—Improvements in machinery intended for manufacturing bricks, tiles, &c., by expressing clay through dies to the orifices of which dies rollers are applied. 1. Communicating alternating periods of motion and rest to these rollers, or to two sets of them, from one shaft, by connecting each set by proper gearing and an endless band with a pully which fits loosely on one part of a vertical driving shaft, but keys on to another part. There are two such pullies free to rise or fall, both moved together by a lever, and so arranged that when one is keying on to the shaft, the other shall be over the part of which it is clear. A to-and-fro motion is given to the lever that moves the pullies by a cam, and thus each set of rollers is alternately set in motion and stopped.

2. The clay being to be cut by wires fixed at one end, but at the other connected to a bar which moves from side to side,

affixing to each end of such bar a roller which is to be supported by a bridge bent to the curve which the bar must describe in order to keep the tension of the wires uniform.

3. Stretching the wires by means of screws formed of square or other angular rods, with a screw thread cut at their angles, passed through angular holes in the frame, of the same shape as themselves, and tightened up by a nut. The screws of this form can slide in the holes they pass through but cannot turn.

[Printed, 10d. Drawings.]

A.D. 1858, October 26.—N° 2385.

NEWTON, ALFRED VINCENT.—(*A communication.*)—An arrangement of rollers and machinery to effect the kneading of clay and its expression through moulding dies. In this machinery several small rollers are arranged side by side around a portion of the periphery of a larger one, which is fitted with flanges that overlap the ends of the small rollers to prevent any escape of clay. Triangular bars are fitted into part of the space between the small rollers, and the clay fed in at one end and carried along is thus always kept near the surface of the central roller. A die is combined with a scraper that detaches the clay from the large roller; this die has a wide and shallow opening to receive the clay and expands vertically while it contracts laterally so as to express the clay in the proper form for cutting into lengths. A circular mouthed die of the same construction, but containing a mandril fixed on a cutting support placed in the tapering part of the die is provided for tubular tiles. Rotating cutters sever the moulded mass into proper lengths.

[Printed, 9d. Drawings.]

A.D. 1858, November 2.—N° 2448.

McDOUGALL, ALEXANDER.—*Provisional protection only.*—Building reservoirs, tanks, culverts, sea walls, and other erections required to exclude water or damp, of bricks or blocks composed of asphalte or other bituminous matter, mixed with sand, gravel, or other grit, and cemented together by using molten asphalte or other bituminous substance.

[Printed, 8d. No drawings.]

A.D. 1858, November 17.—N° 2594.

PLATT, JOHN, and CHUBB, HARRY.—1. Machinery for sifting or screening clay, consisting of a cylindrical screen rotating on an axis, fixed nearly but not quite horizontal : a series of “stampers” fixed side by side within this screen, so as nearly but not quite to touch its interior face, and having serrated edges, pulverize and break the clay, which is fed in at the higher end of the cylinder, and drops through its sides, the stones escaping at the ends. If a large stone comes in the way, the stampers are so hung as to turn upon their centres and allow it to pass. Also a combination of collars fitting into and upon one another, to prevent the clay from getting to the bearings of the axis of this screen.

2. Improvements on the machinery for moulding bricks by combined percussion and pressure in a mould, for which Letters Patent were granted to Arad Woodworth and Samuel Mower, A.D. 1852, January 24, N° 13,918. These improvements consist in adapting a piece of india-rubber to the upper part of the ram, to break the concussion upon the driving shaft below, should it descend low enough to strike that shaft. Also constructing “the” cams or the parts against which they act, with pieces capable of “being detached, so that the acting surfaces may be renewed or “adjusted when required.” “And lastly, in the apparatus for “supplying the material,” the inventors “claim the use of an “additional striker, as illustrated” by one of the drawings,

[Printed, 1s. 4d. Drawings.]

A.D. 1858, November 9.—N° 2822.

ECCLES, JOSEPH.—1. The object of the first part of this invention is to dry and prepare clay earth by artificial currents of hot or cold air, previous to its manufacture in “dry clay machines.”

The clay being first passed through rollers, and otherwise broken up, is delivered on to “a travelling endless belt, apron, or “lattice (upon which it may be broken up into small particles by “suitable mechanism).” Carried to one side of the machine by this belt, it falls on to a second, on which it is carried to the opposite side, and from that it falls on to a third, and so on, being exposed during the whole journey to the surface of rows of pipes which cross the machine, and which contain alternately a steam-pipe and a perforated wind-pipe, through which latter a constant

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stream of air is forced. Any other arrangement suited to effect the purpose, may be substituted for the endless band.

2. In the construction of cores for moulding orifices for making perforated bricks, securing the moulding cores by one or more cross stays, in addition to the bars at the back, by which alone they are ordinarily fixed to the back of the die or mould.

[Printed, 10*d.* Drawings.]

A.D. 1858, December 10.—N^o 2337.

HODGSON, CHARLES.—1. Improvements in and machinery for the manufacture of fuel from peat.

2. The last part of this invention “is also applicable to the “moulding of bricks, tiles, and other plastic materials.” This consists of a tube of uniform bore, but of any desired section or length, with a ram inside it, to which is communicated a short reciprocating motion. A small quantity of material drops in front of the ram between each stroke, and is driven forward by it towards the end of the tube. This end must be at first plugged, but soon the tube will become full of consolidated material, when the plug may be removed, the friction between the clay and the sides of the tube retarding it enough to secure the due consolidation. For consolidating wet peat, a tube with perforated sides is used, the moisture escaping through the perforations. In the drawing, the tube is shown as having two hoppers near together, and discharging at both ends, thus making use alike of the to and fro motions of the ram.

[Printed, 6*d.* Drawings.]

A.D. 1858, December 31.—N^o 3001.

WYATT, MATTHEW DIGBY.—The object of this invention is a secure method of attaching tiles, tesserae, and other wall coverings, to the perpendicular face of a brick wall. The tiles, according to this invention, are made with a projection of a dovetail form, *i.e.*, wider above than below, attached to the upper edge of each, but set back to a plane behind that of the square part of the tile, and of somewhat greater height than the greatest height between any two courses of mortar. However the tile is applied to the wall, *the dovetail* piece will consequently pass a mortar-joint; a nail is

to be driven into the mortar on either side of it, and between these it will hang securely, while the tile next above will overlap and hide the dovetail. A projection with a triangular hole may be substituted for the dovetail, or a projection with several dovetails may be used, or a rod or wire, or strip of metal of an angular form, and having hooks to enter cavities at the back of the tile, may be used. Another mode of fixing is by the use of strips of metal, or a piece of wire secured or hooked to the tile at the back, and which may be made fast to nails driven into the mortar. Tiles may be employed, having a dovetail projection at the back to catch upon nails, driven into a course of mortar in proper positions to receive them. Lastly, lozenge-shaped tiles may be formed, having an undercut recess at the two lower edges, and a projection at each of the upper edges. The lowest of these tiles will be secured by four nails one opposite each face, and all the other tiles by two nails to each one.

[Printed, 7d. Drawings.]

1859.

A.D. 1859, January 1.—N^o 19.

SKINNER, GEORGE, and WHALLEY, JOHN.—“This invention has for its object improvements in the manufacture of “encaustic tessellated tiles, and other similar articles of either “large or small dimensions” from semifluid clay. The mould employed is a metal case in two parts, capable of being separated, and it is lined with a porous lining of wood furrowed on the surface, that being lined with perforated zinc, and that again lined with calico. The semifluid materials are forced into the mould by the power of a force pump, which continues to act until filtration through the pores of the case has ceased, when the tile is completed and may be taken out.

A pattern in pieces of various colours attached to a sheet of clay, or a sheet of clay with a raised pattern, the whole in one colour, may be placed in the mould, before introducing the semifluid clay; in this case the pattern will become imbedded and firmly incorporated in the tile, and will appear distinctly when the surface is cleaned; these ornamental pieces to be wider when

attached to this clay backing than at the face, so that when imbedded in the tile they hold like a dovetail or wedge.

Or a pattern in detached parts and colours may be produced by laying upon one of the moveable sides of the case or mould the pieces forming it, and securing them by pins or even sewing them to the calico lining previous to filling the mould; after which, and before removing the tile, the pattern must be freed by taking out the pins or cutting the threads.

[Printed, 9d. Drawings.]

A.D. 1859, January 15.—N° 128.

ECCLES, JOSEPH.—“An improved manufacture of such articles from clay earths as cornices, mouldings, string courses, blocks, window tops and bottoms, and other articles usually formed of stone, wood, plaster, or other materials,” by moulding them with hollows or perforations, and drying them by means of currents of hot and cold air in the manner which formed part of the invention for which Letters Patent were granted to this inventor A.D. 1857, December 2, N° 2989.

The articles are to be burned in a kiln, where they are screened from the direct action of the flames of the furnace, and subjected to a heat as near uniform as possible.

[Printed, 3d. No drawings.]

A.D. 1859, January 18.—N° 155.

BRADLEY, RICHARD, and CRAVEN, WILLIAM.—This invention relates to machinery for moulding bricks, tiles, &c., from pulverized clay by compression, “the main object being to obviate the difficulty caused by the presence of air in the material under pressure” by a “system of moulding bricks and tiles wherein the moulding action is performed in each case in three or other number of distinct compressing operations.” The moulds are fixed in a horizontal revolving table which receives intermittent motion. Each mould has a piston or moveable bottom, and the first pressure is given by this piston travelling along an incline fixed below the mould table, and being caused to compress the clay against a fixed upper plate. The second and third pressures are given by pistons attached to the machine and caused to enter the mould from above. The incline on which the bottom piston travels being continued under the points where *these two pressures* are given, the brick is during the whole time

gradually raised to the mouth of the mould ; and “ to allow for
“ the varying bulk of the clay just as it may be dry or moist,
“ that portion of the incline on which the under piston rests
“ when the clay is fed in, is made adjustable as to height by
“ means of a lever and screw spindle.”

[Printed, 10*d.* Drawings.]

A.D. 1859, February 2.—N^o 297.

WILKINS, EDWARD.—This “ invention consists in forming
“ half round drain pipes with scalloped or vandyked openings or
“ spaces along one or both of their longitudinal edges, so that
“ when laid down upon a flat surface with their convex sides
“ uppermost, there shall be small spaces or openings for the en-
“ trance or exit of liquid into or from the interior or hollow space
“ between the concave side of such pipes and the flat surface on
“ which they may be laid, so as to serve either for draining or for
“ distributing liquid to the subsoil of land.” The flat surface
under these drain tiles is usually to be of “ sole tiles ” having
turned up edges, sometimes, however, flat tiles or boards, or
metal plates, or a layer of cement, or of lime and gravel, are sub-
stituted.

[Printed, 8*d.* Drawings.]

A.D. 1859, February 16.—N^o 427.

COOKSON, RICHARD, and HOMER, CHARLES WILLIAM.—
This invention relates to machinery for making bricks, tiles,
tubes, &c., by expression through dies, and to improvements in
the mode of jointing drain tiles. 1. The brick machine consists
of a clay box into which clay is constantly being forced by a pug
mill, and in which a piston moves to and fro. At each end of
this box is a brick mould formed of four rollers covered with vul-
canized india-rubber, and the action of the piston expels clay
through these openings alternately. The stream of clay passes
over a web of india-rubber and on to a series of rollers, where, in
the intervals of rest, cutting wires pass through it from side to
side. A revolving hopper with vanes may replace the pug mill.
The reciprocating motion of the cutter frame and wires is ob-
tained by the use of a wheel having teeth cut on only part of its
circumference ; a similar wheel may be used to work the clay
piston, or it may be actuated by a crank, but in either case it is
secured to, and worked by the help of two side plates which

work through slots on the ends of the clay box, and perform the part of a piston rod.

2. In jointing drain-pipes, cutting the ends slanting so that they may fit with a close butt joint at the bottom but be open at top, and slipping a collar with a groove at the top over such joint so as to leave inlets into the drain. Several forms of butt and socket joint with a separate collar to slip over them, the collar being in one instance in two parts, and the object in all cases being to provide for the easy removal and return of a tile at any time.

[Printed, 10*d.* Drawings.]

A.D. 1859, February 16.—N^o 433.

NEWTON, WILLIAM EDWARD,—(*a communication from A. Milch.*)—*Provisional protection only.*—Machinery for making bricks. In this machine the clay is to be transported to the feeding parts of the machine by an endless cloth passed round rollers and a wooden drum. The clay, prepared by passing between crushing rollers and through a pugging mill, is conducted down to a horizontal mould cylinder and pressed into the moulds. It is then a second time pressed, and at the same time pistons in the moulds themselves are pressed out from behind. Finally these pistons are caused to expel the brick on to a travelling belt for removal.

[Printed, 3*d.* No drawings.]

A.D. 1859, March 5.—N^o 584.

SAVAGE, WILLIAM PEACOCK.—“An improved machine for “excavating, raising, and depositing soil,” applicable to a variety of purposes, and amongst others, to “raising and casting up clay “or brick earth for making bricks or tiles.” In this machine, which is very similar in principle to a common sort of dredging machine, “the earth or clay is raised by two sets of iron cups or “buckets on endless chains which are propelled into the ground, “and which chains of cups or buckets revolve upon axes. The “two sets of cups or buckets descend into the land to different “depths,” one removing the surface, the other the subsoil, and *they discharge* the earth which they bring up on to “travelling

“surfaces,” being endless chains carrying boards, and passing round rollers.

The machine is locomotive ; it is caused, as it works, to advance slowly by winding up a chain that passes round a pulley anchored or fixed at some distance.

[Printed, 1s. 4d. Drawings.]

A.D. 1859, March 12.—N° 636.

THORNTON, JAMES.—“The object of this invention is to “manufacture plain, ornamental, and perforated bricks and tiles “by machinery,” of which machinery the principal peculiarities “consist in the so forming the mould or die, that it may be “readily expanded and contracted in all directions, at the same “time the sides remain upright, and the angles are so contrived “that no opening takes place at those points.” The mould, which is open at the top and bottom, consists of two hinged pieces termed jaws which form its ends, and two cross pieces which form its sides, and which have curved extremities fitting into similar grooves cut in the jaws, and so arranged that the closing of the jaws shall also cause the sides to approach one another. The jaws are hinged to a sliding frame which moves in guides, and after a lump of clay has been introduced into the expanded mould this frame is drawn back along a fixed bottom plate, bringing the mould under a fixed top, which with the bottom plate will form the upper and under surfaces of the brick, at the same time the action of certain inclined planes fixed to the guides in which the frame and mould are moving forces the jaws together, and thus contracts the four sides of the mould and compresses the brick. A die for stamping or a series of perforators may be fitted into one side of the mould, and, being prevented by a stop suitably placed from accompanying the mould when the latter is drawn back, will stamp or perforate the bricks as the case may be. The moulding being completed the mould is slid back by the machine, and as it returns is caused to re-open ; the brick thus left free is pushed out of the mould by the lump of clay which it is next proposed to mould.

A pug-mill may be combined with the above described mechanism so as to constitute the two a complete brick machine.

[Printed, 1s. 4d. Drawings.]

A.D. 1859, March 14.—N° 646.

SMITH, EDWARD.—(*Provisional protection only.*)—This invention relates to the materials with which mill furnaces and puddling furnaces are to be lined internally, which materials may be formed into bricks or otherwise applied. The lining for mill furnaces is to be prepared from flints calcined and pulverized, and that for puddling furnaces is to be from the slag obtained from a mill furnace so lined.

[Printed, 3d.]

A.D. 1859, March 21.—N° 707.

HAGGETT, WILLIAM.—This invention consists in giving to various materials, and amongst others to bricks and tiles, a corrugated surface composed of more than one series of corrugations crossing each other at right angles or diagonally; this is done with a view to increase the strength of constructions to which the corrugated materials are applied by the interlocking of the mutually corresponding surfaces, or by adding strength in more than one direction to the materials themselves.

[Printed, 6d. Drawings.]

A.D. 1859, March 23.—N° 741.

HIELAKKER, JEAN VANDEN.—(*Provisional protection only.*)—Improved apparatus for moulding artificial fuel, firebricks, or similar articles by percussion. The materials to be operated upon are in a mould fitted to a mass of iron which is supported on framing. They are compressed by a stamper which receives the successive blows of a hammer or monkey, alternately raised and released by the arms of a revolving wheel; a spiral spring at the top of the hammer assists in giving force to its blows. "There is a rack, which when acted upon, by a lever, raises a plug and with it the moulded substance; a drawer or receiver slides underneath a hopper, by which materials are conducted to the mould."

[Printed, 3d.]

A.D. 1859, April 4.—N° 836.

ECCLES, JOSEPH.—Improvements in that class of brick machines where a pug-mill is combined with moulding orifices.

1. An improvement in that class of such machines which is fitted with pushers to force the clay through the moulding orifices, having for its object to guard against breakage or stoppage should a stone or other foreign substance present itself. This is done by providing a sliding plate in the upper part of the clay chamber in which the pusher works. This plate will maintain its position during the ordinary action of the machine, but under any extraordinary pressure will slide in its bearings, thus leaving an opening through which clay may escape.

2. Combinations of a pug-mill with rollers "that shall not only crush and deliver the clay to the pug-mill, but assist to force the material through the pug-mill, to be expressed through the moulding orifices." In the combination considered by the inventor most advantageous the pug-mill is horizontal, and the clay fed into it at one extremity is propelled to the other by the action of pugging blades fixed obliquely. There are two mouthpieces, each terminating in a die or moulding orifice, at opposite sides of the mill and near its extremity. On the shaft of the mill and opposite the mouthpieces is a single wiper, being a wide and close fitting blade, the action of which is to produce an intermitting delivery of clay through the two mouthpieces alternately, thus giving time for it to be cut into lengths.

Two pair of rollers turned true, each pair of which may be driven separately by a belt from a drum, prepare the clay and force it into the mill. These rollers work between metal plates made to fit true to their ends, and doctors are fitted to them which also form side pieces.

In one modification of the above the pug-mill is placed with its axis vertical, the two lateral mouth-pieces being at its lower end. In a second modification the pug-mill remaining horizontal, but the lateral mouthpieces and wiper are dispensed with, and the clay is expelled in a continuous stream through moulding orifices in a line with the axis of the pug-mill.

A.D. 1859, May 26.—N° 1301.

DORN, CHARLES.—(*Provisional protection only.*)—Improvements in kilns.

1. Building them with double walls, the inner one of fire-brick, and the outer one of common bricks, "the said outer wall being made in the form of a series of concave vertical flutes or arches. The outer wall is supported by iron standards and bound by iron hoops, and the space between the inner and outer walls is filled with sand or other imperfect conductor of heat."

2. Constructing the floor of the kiln of fire-bricks, ranged radially with interspaces connected with a central flue. Said floor is supported by means of perforated walls upon an arch or dome also perforated." "The furnaces or fire-places are made of flat bars arranged in a stair-like form," and the flame, &c., is admitted to the kiln "through an annular channel, formed between the edge of the kiln floor and the inner wall."

3. Constructing on the top of the kiln a reservoir, in which "slip" can be heated and evaporated, or which can be used for other like purposes.

[Printed, 3d. No Drawings.]

A.D. 1859, May 26.—N° 1304.

CHANTRELL, GEORGE FREDERICK.—1. Improvements in the forms of fire-clay blocks or lumps, and of tiles for forming chambers in charcoal kilns, as described in the specification to Letters Patent, granted to this inventor A.D. 1853, October 17, No. 2388. Those parts of these blocks which form the ends of the chambers in the kiln are to be made to project more than heretofore, so as to overlap the outer sides of the tiles forming the sides of the chambers. In some cases, these tiles will run past the blocks, the form of which will be modified; the tiles, when this occurs, will be jointed to one another vertically, and grooved to receive a projection left on the block; the floors also will not be carried as before by the blocks, but by the fire-brick lining of the draught flues.

2. Other improvements applicable to the inventions for which the above named and other Letters Patent were granted to the same inventor.

[Printed, 7d. Drawings.]

A.D. 1859, May 30.—N° 1326.

GRIMSHAW, WESTON.—Improvements in machinery for compressing bricks, tiles, artificial fuel, and other similar articles. This “invention consists in making small perforations in the “ pistons, plungers, or stampers, or in the sides of top or bottom “ of the moulds, or in either or all, for the air to escape through.”

Applicable to machinery for which Letters Patent were granted to this inventor and Ellis Rowland, A.D. 1853, September 7, No. 2060, and also to other machinery for the same purposes.

[Printed, 8d. Drawings.]

A.D. 1859, June 16.—N° 1451.

MENNONS, MARC ANTOINE FRANÇOIS,—(*a communication from A. Mombrun.*)—This invention consists in “the general construction and arrangement of a kiln for the burning of bricks “ and plasters.” This kiln has a series of fire-grates and ashpits running from front to back and parallel to one another; between them are formed in the floor of the kiln flues, open at the top, and not communicating directly with the fire openings, but all opening into a chamber at the back of the kiln, which communicates with an external chimney. The kiln, if for bricks, must be vaulted; for plaster, it may be covered with iron. In charging the kiln, open spaces are left for some height over the fire-bars, and the flame, smoke, and heat rising through these spaces, and between the articles above them, is reflected down from the vault, and has to make its way back between the bricks or other articles to be burned to the bottom of the kiln, before it can reach the flues by which the smoke escapes into the chimney, thus pervading every part of the kiln. There is a damper in the chimney flue to regulate the draft, and doors for charging and emptying the kiln or cleansing the chimney are provided; these doors must be built up when the kiln is in use.

[Printed, 9d. Drawings.]

A.D. 1859, June 22.—N° 1498.

BUCKWELL, WILLIAM.—(*Provisional protection only.*)—Improvements in the manufacture of materials for structural purposes.

1. "Subjecting matter in moulds to pressure of impact" by hammering and rolling the same, for blocks, pavings, and many similar fabrics. These may be made with a fine material for the face, the mould having been first partly filled with coarser material.

2. Forming paving, flooring, &c., in a similar manner, but continuous.

3. Moulds and rails for the above purposes.

4. "Travellers with improved girders and gear, and the attaching thereto inverted hammer frames with boiler over," as described in the specification.

[Printed, 3d. No drawings.]

A.D. 1859, June 23.—N^o 1511.

HUGHES, EDWARD THOMAS,—(*a communication from Léon and Edouard Pavin de Lafarge.*)—A new material from which can be manufactured "artificial sandstone, bricks, tiles, and similar articles."

1. "The amalgamation of unyielding or refractory sand or quartz with aluminous earth, pulverized or reduced to a fine powder either before or after calcination." In place of the sand or quartz, "baked or calcined refractory earth, reduced to a state of powder either before or after its calcination," may be substituted.

2. "The employment or use of the said compound or mixture, either separately or conjointly in any desired proportions, pulverized and sifted, then dried or burnt as may be desired." This compound may be moulded moist or dry; if dry, it may be subjected to pressure to consolidate it.

[Printed, 3d. Drawings.]

A.D. 1859, July 8.—N^o 1631.

TAYLOR, JOHN.—"This invention has for its object improvements in the construction of walls to prevent damp from rising, and also in tiles to be used for this purpose in building walls."

The tiles are to be made of non-absorbent material, and to be as long as the wall is thick, and as wide as an ordinary brick is long, and they are to be thickened on the face at each side to form a kind of flanges. Two courses of these tiles are to be

built in just above the ground level, the lower course laid with their flanges projecting upwards, the upper course laid breaking joint with the lower, and with their flanges projecting downwards. The flanges are of such widths that when the tiles are thus laid air-spaces running through the wall will be left between the adjoining flanges of the two courses of tiles. The invention also contemplates building into a wall one course of ordinary tiles laid at short distances apart, with or without a second upper course of wider tiles laid continuously; it also includes tiles with a groove at each edge, to be laid close together, when the two grooves will form an air space; these tiles may for convenience of bonding be as deep as a course of bricks. Any of these tiles may be made with perforations, and the surfaces where they form mortar joints with brickwork may be roughened.

[Printed, 1s. Drawings.]

A.D. 1859, August 18.—N° 1903.

WILSON, WILLIAM.—This invention relates to improvements in the preparation of clay for bricks, tiles, &c., and in the machinery employed in the manufacture of the same. 1. To prepare the clay for use the clay field or pit is covered with a temporary roof, under cover of which the clay is dug up in lumps and turned over to dry, hot air flues or pipes being conducted through the clay-house. These lumps are ground down by edge-rollers travelling round in a circular pan fitted with an annular sieve all round it, and the ground clay dropping through this sieve is received in a sloping channel which is kept slowly revolving, and within which it is moistened by a current of steam.

2. The clay prepared as above is fed into moulds fixed near the edge of a horizontal circular table to which intermittent motion is given. The bricks are consolidated one by one, during the moments of rest of the table, by the upward pressure of a ram actuated by a crank, and bearing against a loose bottom in the mould. The subsequent motion of the table carries this false bottom over guides which elevate it so as to expel the brick. Steam or hot water is caused to circulate round the moulds. In the consolidating ram is a peculiar arrangement, the pressing part being distinct from the ram itself with a certain quantity of fluid between them, should any obstacles, stones, &c. present themselves, the

valve retaining the fluid in place will yield, the fluid will escape, and any jar or fracture of the machine will be prevented.

[Printed, 1s. 9d. Drawings.]

A.D. 1859, September 17.—N° 2113.

LUIS, JOSÉ,—(*a communication from Alexis Maigué.*)—"A new "brick and tile making machine." In this machine the prepared clay is placed in a hopper, out of which it passes through a rectangular space between two large cylinders covered with cloth gearing with each other, and moved by hand. The stream of clay moulded by passing these rollers is carried hence by an endless cloth; it leaves the cylinders of a width sufficient to form two bricks, and is first divided longitudinally by a vertical wire, after which it is cut into lengths by a second wire attached to a cutting frame.

[Printed, 6d. Drawings.]

A.D. 1859, September 21.—N° 2146.

GEYELIN, GEORGE KENNEDY.—(*Provisional protection only.*)—Machinery for making bricks and tiles, and drain and socket pipes, apparently intended to act by expression of the material through moulding orifices. The description furnished by the inventor is as follows:—"This machine consists of a single "threaded screw, of one revolution or more, over the die box, "and to obtain greater power of feed I use either a fixed accumulator or a reversed pug mill motion above the screw. By "this construction enormous and continuous compressing power "is obtained, and dies can be fixed on five sides of the die box. "I claim also the mode of making socket pipes without a moveable platform, by merely using moulds which preserve the form "of the pipe in its descent."

[Printed, 3d. No drawings.]

A.D. 1859, October 3.—N° 2236.

BROOMAN, RICHARD ARCHIBALD,—(*a communication from Jean Marie Rabier.*)—This invention relates to the treatment of clay, to moulding by compression, and to forms of bricks and tiles.

1. Freshly dug clay is to be mixed with dry powdered clay, dried in the open air and then crushed, passed through a sieve, and lastly "damped to bring it to a pasty state."

2. Moulding bricks in moulds fixed on a rotating circular table, and causing them to be simultaneously compressed from above and below, or from one direction only.

3. Forming paving tiles with an overhanging top so that when laid they shall show a close joint on the face, but leave room for mortar below it. Circular tiles. Bricks with hollows in the interior not reaching the face, to be made in two halves and then joined. Bricks with hollows at top and bottom, but not extending through the brick, as a solid portion is left in the centre.

[Printed, 3d. No drawings.]

A.D. 1859, October 12.—N° 2316.

SKERTCHLEY, JOSEPH.—This invention relates to "improvements in the manufacture of mosaic and other ornamental tiles and slabs."

1. Manufacturing such slabs with the edge beveled off from near the front to the back, or rebated so that when laid their faces shall be in perfect contact, while grooves to receive cement will appear at the back; also forming cavities in the centres of the back part of the tesserae, into which the cement of the backing may enter to form a key.

2. "The manufacture of tiles or slabs with indentations, recesses, or perforations formed therein, for receiving other pieces of fired material of different shades or colours."

3. Forming moulds for tesserae of irregular forms, consisting of a "middle plate," pierced with openings corresponding to the shapes of the tesserae, screwed down upon a flat under plate faced true, and surrounded by a moveable frame open at top; material being put within the frame, a pressing plate having a flat surface is caused to descend and force the material into the openings; after the pressing plate and frame are taken away, the surplus material can be removed, and the tesserae will be left sharply defined at the edges, in the middle plate.

4. Contrivances for facilitating the arranging of the tesserae in patterns, tesserae of different colours are arranged in troughs or holders open at the end, and a plate having openings corresponding to the position of the colours in the holders, is caused to

pass under them in such a manner that where a piece of any colour is needed for the pattern it shall drop through one of the openings into a tray or other receptacle below. The details of this part of the invention may be varied by projecting pegs being caused to strike the required tesserae from their position in lines, or by the perforations or pegs being upon a flexible band, or a cylinder or drum in place of a plate, and in other ways.

5. "In order to facilitate the arrangement of mosaic work into "patterns by hand," the inventor employs "perforated plates to "determine the position of each separate colour and piece in the "design." There are as many plates, each applied in turn as there are colours, and each plate is perforated in those parts only where tesserae of the colour to which it applies will appear in the pattern.

6. An application of the principle of No. 5 to the manufacture of tiles by the method described under No. 3; different "middle plates" being successively filled with different colours, and their contents forced out successively in the same press, so that when a set of plates and colours has been gone through a complete pattern shall have been formed and shall be ready for firing.

[Printed, 1s. 2d. Drawings.]

A.D. 1859, October 26.—N° 2450.

ARMOUR, JOHN.—This invention relates to "apparatus for "measuring and regulating supplies of solid and liquid substances in the preparation of mixtures," and is applicable especially to the preparation of fire-clay of different consistencies. It consists in "the construction of an apparatus, with a set of "compartments or divisions, and furnishing the same above and "below with lids or covers formed with apertures in order to "allow different substances (solid or fluid) to pass down in "regulated supplies into one common receptacle." Either the lids or the compartments are to have rotary motion, the vessel being cylindrical in shape; and each compartment is alternately filled through an aperture in the upper lid, and emptied through one in the lower, so that by regulating the speed of the rotary motion the supply of material can be exactly controlled.

[Printed, 9d. Drawings.]

A.D. 1859, October 31.—N° 2483.

BROOMAN, RICHARD ARCHIBALD,—(*a communication from Lippman Schneckenburger and Co.*)—Plastic compositions for use for building and decorative purposes, and in lieu of marble, stone, brick, &c. The ingredients of these compositions are sulphate of potass, gum arabic, purified cement, marble or alabaster in powder, and slaked lime. Employing in backing up articles faced with this composition, hemp, tow, or other filamentous material cut small and incorporated with the above ingredients. Employing the compositions as the material of which to manufacture moulds in which articles made from the same compositions are to be cast.

[Printed, 4d. No drawings.]

A.D. 1859, November 3.—N° 2504.

HOWARD, JOHN,—(*a communication from M. Becherer and C. Kessler.*)—The object of this invention "is to make it possible to " mould hollow bricks and other hollow articles with a closed " end, by pressing them through a die," the pressure of the external air against the vacuum created between the front of the die and the closed end of the article, when it was pushed forward, having been found to offer an impediment to this mode of manufacture of such articles. "To remedy this it is proposed to admit air " to the interior of the moulded article, or to the inner face of the " closed end thereof, just prior to its starting from the die." ¶

In the machine for moulding hollow bricks on the principle of this invention, a die and mandril are provided, and a short distance in front of the mandril a moveable cover closing the die. The mandril is hollow, and its face is perforated, a plate turning on a pivot inside the mandril being also provided, fitted with perforations corresponding to those of the mandril. The mould being closed by the cover, and the perforations in the mandril covered, clay is forced through the die till the front of the brick is formed; that this is completed is indicated by clay oozing out of a small aperture in the cover. The pressure is then removed and the cover taken off, and at the same time the apertures in the mandril face are uncovered to admit air. Pressure being again applied as much clay as is necessary is allowed to pass; the moulded article is now cut off and the cover replaced on the die

to form the closed end of the next one. This invention is also applicable to crucibles, retorts, jars, &c.

[Printed, 10*l*. Drawings.]

A.D. 1859, November 16.—N^o 2603.

WARD, JAMES, and BURMAN, HENRY.—1. The first part of this invention relates to an improvement on the machinery which formed the subject of Letters Patent granted to James Ward, and William Burman, December 30, A.D. 1852, N^o 1202, and consists in actuating the mould table by connecting it to one end of a lever, the other end of which ends in a fork, and which is made to oscillate, (thereby communicating the required oscillating movement to the table,) by the action against the opposite limbs of the fork alternately of two rollers carried by a revolving disc.

2. "A machine for preparing clay by forming it into clods to be acted upon in the brick machine." A hopper delivers the clay over a roller which continually revolves; towards this hopper a mould is caused to advance, taking in its feed of clay as it does so, and parting with any excess through perforations. Upon reaching the roller this mould, being filled, recedes, and its contents are forced out in the form of a clod by a piston; after which the mould again advances to obtain another charge.

[Printed, 10*l*. Drawings.]

A.D. 1859, November 19.—N^o 2617.

BLINKHORN, WILLIAM.—This invention lays claim to "the novel application of the waste sand, spent gypsum, or other available residues arising from the grinding, smoothing, and polishing of plate glass to the manufacture of bricks, tiles, or quarries, for the purpose of increasing their durability and fire-resisting properties, whether employed separately or in combination with other earthy matter or minerals," such as clay, lime, or oxide of iron, or a small portion of pulverized quartz.

[Printed, 3*l*. No drawings.]

A.D. 1859, November 21.—N^o 2633.

NEWTON, WILLIAM EDWARD,—(*a communication from John Williamson Crary.*)—This invention consists of an improved machine for moulding or pressing bricks. The moulds in this

machine are rectangular and arranged with their mouths directed inwards on the concave or inner face of an annular rim or moulding wheel, mounted vertically on an axle, and having rotary motion given to it. Clay is fed into them from a pug mill through a trough, and receives compression by the action of a roller mounted inside the concave moulding surface or rim, near its lowest point.

The outer side of each mould is formed by a false bottom or piston, and a rod connected with this piston is brought by the rotation of the wheel into contact with a guide, which causes it to expel the brick towards the axis, and at a level above the axle of the mould wheel. The brick is received and removed on an endless web. "Instead of causing the moulding surface to form a complete circle, and being made to rotate, it might be made to form only part of a circle, and arranged so as to oscillate."

[Printed, 7*d*. Drawings.]

A.D. 1859, December 5.—N^o 2751.

SHORT, CHARLES; SMEETON, THOMAS BOWES; and BOWLER, WILLIAM.—This "invention consists in manufacturing bricks, tiles, drain pipes, and other articles from cinder or refuse slag," such as forms in the processes of manufacturing, puddling, or refining iron. The material is to be poured in a molten state into iron or other moulds, and so soon as set to be transferred to an annealing furnace, and there gradually cooled.

[Printed 3*d*. No drawings.]

A.D. 1859, December 9.—N^o 2794.

SPILLER, JOEL.—An improved drying house for bricks or other articles made of clay, forms the object of this invention. The heated air and smoke from a furnace, mingled with a certain amount of atmospheric air, enters this drying room at one end and near the level of the ceiling, and is allowed to escape through a series of flues or chimnies, with sliding doors fitted to their openings; these openings are near the floor of the drying room,

and the heated air, &c., does not escape through them till it has filled the kiln. The articles to be dried are ranged on wooden stages.

[Printed, 10*d*. Drawings.]

A.D. 1859, December 12.—N° 2818.

WATSON, GEORGE CHURCHILL.—This invention consists in forming “novel and artistic bricks or lumps,” having a recess formed in each, and a projecting lip, which in combination with the bottom of the recess forms a basin in which soil may be placed, and a fern or plant grown. These blocks are preferred to be of dimensions to bond with ordinary bricks, and they may be arranged to form part of circular or polygonal columns. A hole is provided at the back of each for drainage or watering.

[Printed, 6*d*. Drawings.]

A.D. 1859, December 22.—N° 2918.

NEWTON, ALFRED VINCENT,—(*a communication from Friedrich Hoffmann and Albert Licht.*)—“This invention relates to a “novel construction of kiln or oven for burning limestone, bricks, “and other substances by a continuous process,” to perform which “the kiln or oven is built of an annular form, and by preference sunk in the ground, so as to leave the roof only “exposed. This enclosed annular space is divided radially into “compartments by sliding doors, and each compartment is connected by a radial flue with a concentric annular smoke “chamber, which surrounds the central chimney shaft.” Communications can be opened or closed at pleasure by dampers or doors between the chambers and in the flues.

The materials to be burned being mixed with fuel are placed in the chambers, and a fire having been kindled, the burning is to be maintained uninterruptingly, the air admitted from without being obliged to pass through all the compartments that are full before it is allowed to escape into the chimney. As the contents of each compartment become burned, that compartment is cut off from the series, and the air to supply combustion in the others is warmed

by being passed through it, similarly the compartments as fast as they are refilled are again brought into connexion with the fire.

[Printed, 10d. Drawings.]

1860.

A.D. 1860, January 2.—N° 1.

LUIS, JOZÉ,—(*a communication from Joseph Tenaud.*)—*Provisional protection only.*—Machine for moulding bricks. In this machine clay is put into a cast-iron mould having a piston worked by a treadle at the bottom of it. A “stamping lever” acting as a press or pile hammer is brought heavily down upon the clay once or twice, and the brick so moulded is ejected by working the treadle by the foot. A modification of the above, in which a rotary table having intermittent motion holds the moulds, and the stamper acts by horse or steam power, and communicates motion to the table.

[Printed, 3d. No drawings.]

A.D. 1860, January 26.—N° 201,

EFFERTZ, PETER.—Improved machinery for making bricks in moulds from clay not previously prepared. In this machinery the clay is thrown into a hopper away from which it passes through a channel, its progress along which is caused by the action upon it of spiral knives or archimedian screws. In this channel it encounters a grating which stops stones, roots, &c., from entering the moulds, and from the channel it falls into a “conducting vessel,” which has a periodical alternating movement. At the proper time this vessel moves forward, carrying its charge of clay over a “main box or vessel,” and here a piston lowered from above forces out its contents downwards upon two beaters, the office of which is to distribute them evenly over the surface of a piston, which forms the bottom of the main box; this accomplished, the conducting vessel is withdrawn. A slide is now caused to cover the main box, and a set of nine or some other convenient number of moulds open above and below, enters the

box immediately under this slide. The piston being now caused to rise, forces the clay into the moulds; and when the pressure is completed, the latter are moved out under a series of "stamps" or pistons, which, acting from above, expel the bricks down on to an endless apron for removal.

A modification is described, in which the moulds are stationary, being fixed immediately above the expelling stamps, and the clay being fed into them, is consolidated by pressure from above, after which the moulded articles are expelled by the elevation of the stamps.

It is stated that with the assistance of suitable transport waggons from 65,000 to 70,000 bricks can be moulded by the most powerful arrangement of this machine in ten hours.

[Printed, 1s. 6d. Drawings.]

A.D. 1860, February 2.—N^o 269.

BRETHON, LOUIS JULIEN.—"An improved press for the compression of bricks, tiles, and similar articles." In this press the articles are put one by one into a mould, and consolidated by the forcible descent into the mould of a metal plate or cover; the pressure is given by a hand lever turning a shaft, which carries a cam or "wiper," by the action of which the slide carrying the compressing plate is drawn down. When released, the lever returns to its original position through the action of a counterpoise weight, and in doing so causes a plate that lies under the article in the mould to rise, and thus pushes up the compressed brick or tile to the mouth of the mould for removal.

[Printed, 8d. Drawings.]

A.D. 1860, February 7.—N^o 320.

WHITEHEAD, JOHN. — *Provisional protection only.*—This invention consists in an improvement in the dies or moulding orifices used in moulding machines acting by expression, and consists in applying "to the inner sides of the die, next the clay" or other plastic material, a lining of some slippery or lubricating "substance."

[Printed, 3d. No drawings.]

A.D. 1860, February 15.—N° 410.

PERCY, WILLIAM CARTER STAFFORD.—(*Provisional protection only.*)—This invention relates to improvements in the preparation of clay, and in machines for moulding articles by expression through moulding orifices.

1. Preparing clay by forcing it out of a chamber by a piston through screens or grids.

2. Working the pistons of expressing machines by an arrangement of gearing which introduces a worm and worm wheel, and means of regulating the speed of the machine.

3. Making chambers of such machines, when horizontal, of cylindrical or oval form, all in one piece, strengthened by ribs, and the chamber for the screens and mould, or for the screens only, all in one piece.

4. Employing in the preparation of clay moveable screens which shall be continuously passing through the clay chamber while at work, so as to remove all foreign substances without stopping the machine. These screens may form a circular disc, or an endless chain of bars.

5. A vertical expressing machine, in which the piston acts upwards, but it is not allowed to reach the mouth of the cylinder; this opens at the top for the removal of stones, &c., and introduction of fresh clay.

6. A mode of forming flower pots, &c. Forming solid or hollow bricks in expressing machines, by checking the escape of clay from a mould box till the contents have become well consolidated, and then allowing enough to pass to form one brick, which is then to be cut off by a wire cutter.

7 and 8. Machines combining apparatus for the preparation of clay and moulding of bricks into one.

9. Improvements on the invention which formed the subject of Letters Patent granted 16th February 1855, No. 350, to the same inventor and William Craven, which improvements consist in having the arrangements portable, and in employing several rail-ways and in adding a stove and flues.

10. The use of vulcanized india-rubber as a packing to the pistons of clay machines, to prevent leakage.

[Printed, 3d. No drawings.]

A.D. 1860, February 16.—N° 425.

COWDERY, GEORGE.—An improved machine for making bricks in moulds forms the subject of this invention. In this machine the moulds are arranged in an endless chain, and are caused to pass through the machine. The clay is fed into them out of “a hopper having a triangular revolving shaft placed therein (not shewn in the drawings), or other suitable contrivance for the purpose of pressing the clay or loom into the moulds,” and after this the progress of the chain carries the moulds thus filled between a pair of rollers which consolidate their contents and one or both of which is supplied with projections that form an indent on one or two faces of the brick. The moulds now pass under a third roller armed with projections of which one enters each mould and dislodges the brick, which drops on to an endless band.

This machine can be worked by any convenient power, and may be made portable.

[Printed, 9d. Drawings.]

A.D. 1860, February 17.—N° 437.

MORRELL, THOMAS HENRY.—“Improvements in apparatus used in moulding and pressing bricks, and in drying bricks, tiles,” &c.

1. “The lining of machine moulds or dies for making solid or perforated bricks with raw untanned skin or hide.”

2. “The use of one cross-bar, with two or more rows of perforators or studs attached thereto for the moulding of perforated bricks;” such bar being fixed in the die through which a stream of clay is caused to pass.

3. In pressing perforated bricks, the employment of two loose plates, each carrying a plate to impress a sunk panel on the face of the brick, and attaching to such plate a series of cores, one to each perforation of the brick. The cores are hollow, and each has a hole pierced in it for the escape of air; they are by preference conical, and of such a length as that their ends shall meet in the middle of the brick when the pressure is complete.

4. Arranging the bricks to be dried on two tiers of frames resting on the floor of drying sheds (the upper tier moveable), and three tiers of racks connected to the roof of the same.

5. Supplying these sheds, which are heated by flues or pipes, with hot air from a chamber communicating through dampers with one end of any or all of them, and drawing it off by connecting the other end of each one through a flue with a short vertical chimney, a series of which are to be built round the chimney shaft of an engine, boiler, or furnace, and are to open into such chimney shaft.

[Printed, 1s. 7d. Drawings.]

A.D. 1860, February 24.—N° 503.

SALISBURY, ROBERT.—(*Provisional protection only.*)—Improvements in the arrangement of drying sheds for moulded articles. The sheds are to be provided with hot air flues or heating pipes, and a fan blower for forcing a current of air into them, and a furnace chimney for extracting the products of evaporation are to be combined with them.

[Printed, 3d. No drawings.]

A.D. 1860, March 3.—N° 587.

ECCLES, JOSEPH.—1. The first part of this invention relates to an improvement in the form of the “wiper” proposed to be fixed on the pugging shaft of machines for preparing clay, and which formed part of the invention for which Letters Patent were granted to the same inventor A.D. 1859, April 4, N° 836 (not N° 826 as erroneously stated in this specification). The improvement consists in forming this “wiper” with two flanges, one at each edge, instead of its only having one flange, the object being both to prevent any escape of the clay, and to concentrate and direct it more evenly through the surface which it has to pass.

2. In machines for pressing or finishing bricks or tiles, solid or perforated, which have been already moulded and partly dried, arranging the mould box so that two or more of its sides are moveable, so as to enable it to expand to admit of the brick or tile being introduced without damage, and again to contract before the pressure is given.

3. In finishing perforated bricks in a similar machine to the above, providing an outlet for compressed air by perforating the top or sides of the mould with holes which will come opposite the perforations of the contained article. In pressing perforated

bricks the mould box is to be wider at the centre than the ends to allow for unequal shrinkage during burning, the amount of such allowance necessarily varying with the nature of the material.

[Printed, 10*d.* Drawings.]

A.D. 1860, March 27.—N^o 791.

CRAUFURD, MATTHEW.—Improvements in blocks or bricks for building purposes form the subject of this invention. These blocks, from whatever material, and of whatever shape constructed, are to be tubular or perforated, so that when built together breaking joint the apertures of two or more adjoining blocks may coincide.

Into these other blocks of any required shape or size, and which may also be tubular, are to be inserted to act as dowels in preventing the blocks from sliding on one another. If desired concrete* or any other suitable filling up may be introduced into these hollows.

[Printed, 7*d.* Drawings.]

A.D. 1860, April 16.—N^o 949.

BURSTALL, THOMAS.—This invention consists in an improvement upon the machinery for making bricks in moulds from pulverized clay, which formed the subject of Letters Patent, bearing date 5th March 1857, No. 647, and granted to this inventor. According to this improvement, the upper plunger, driven by eccentrics on a shaft, is caused to give two pressures during the moulding of a brick, and the lower one only one. During the first pressure, by which the brick is partially consolidated, the bottom of the mould remains immoveable, and it is only when the second pressure is given that the lower plunger is raised by the elastic force of steam in a cylinder, so as to finish the brick “by combined opposite pressures.”

[Printed, 9*d.* Drawings.]

A.D. 1860, April 30.—N^o 1089.

GREEN, HENRY THOMAS, and WRIGHT, SAMUEL BARLOW.—Machinery for the manufacture of plain and ornamented bricks, tiles, &c.

1. Mechanism for screening clay, consisting of a circular screen with working against it a "roll-squeezer" made elastic, by preference hollow, coated with vulcanized india-rubber, and with water-pressure inside; the stones or other foreign matters get imbedded in the elastic roller, and being by that means removed from the clay, are afterwards scraped off the roller.

2. Machinery for combining into one sheet of clay (by pressure between rollers) two or more streams of clay, delivered from pug-mills or other machines, thus enabling coarse clay to be used for the body, and finer clay for one or both faces of a brick or tile. This sheet of clay, carried forward on an endless belt, is impressed with a pattern by passing under a printing roller carrying "prints," and is subsequently cut into lengths by a "guillotine cutter." This cutter is held up by a spring and works in sliding guides, which are also held in place by a spring. At the proper moment for making a cut, a tooth of a ratchet wheel engages with a projection on the sliding guides, and causes them to move forward at the same rate as the clay is travelling; and at the same time a cam revolving above the cutter depresses it, and causes it to make a cut; as soon as the cam and the ratchet wheel release the cutter and the guides, the springs belonging to each bring them back to their original positions ready for the next operation.

3. The scrapers employed to detach the streams of clay from the rollers, between which they are compressed, are also distinctly claimed.

4. Cheeks faced with brass scales, as described in the specification to Letters Patent granted to the same inventor, 19th July 1855, No. 1626, may be employed instead of flanges to the printing roller, to prevent the clay from spreading laterally.

5. The printing roller may be replaced by a stamper having a vertical motion, actuated in a manner similar to the guillotine cutter already described. This stamper is accurately fitted with a frame or "inverted box," with sharp thin edges, the size of the intended tile; this frame is caused to descend upon the clay before it is impressed, and rises from it after the stamper has left it.

6. A peculiarly constructed die, through which clay is to be expressed where bricks or thick articles are required. The external part of the die is similar to the one described in the specification already referred to, and has the corners of its mouth made to project and come to a point, so as to retain a hold upon

the angles of the brick. The back of the die is a "mouth" of very peculiar form, as shown upon the drawings, and intended, while bringing the clay from the sectional shape of a flat stream to that of a brick, to "afford such differing angles of resistance, or of angles of permission of egress to the clay, as shall cause an equal compression of the issuing clay:" the central portion of this mouth is of elliptical section.

7. An improvement to a cutter described in the specification to Letters Patent granted to the same inventors, 27th November 1857, No. 2958. In this improvement a small roller, kept bearing against the clay by a spiral spring, is substituted for the doors formerly employed to guard the clay during the exit of the wire; this roller gives way at the moment when the wire reaches it, and then returns to its place.

8. A mode of packing the ends of rollers, where they bear against cheeks or metal plates. This is done by bevelling their ends, and applying curved rods of triangular section to the recess between these bevelled ends and the metal plates, these rods to be adjustable with screws. Curved bands of a flat section, with packing behind them, may be substituted.

[Printed, 3s. 2d. Drawings.]

A.D. 1860, May 11.—N^o 1167.

MORRELL, THOMAS HENRY, and CHARNLEY, HENRY.—This invention relates to machinery for manufacturing bricks, &c. by pugging and preparing plastic materials and expressing the same through moulding orifices. This machinery includes "a pug-mill so that the clay or other plastic material shall pass through it and thence through one or more pairs of revolving rollers placed at suitable distances apart. The clay or other plastic material then passes into a chamber in which works a piston or push plate (or pistons or push plates) moving alternately from end to end of the same, being actuated by a crank or other convenient means. At each end of the chamber is a die (or dies) of the required form, and also any ordinary arrangement of apparatus for cutting off and removing the bricks or other articles as they are made."

In the machine as shewn on the drawings the pug-mill cylinder is fixed in a horizontal position and the clay on leaving it passes vertically downwards between the rollers and the chambers, from

the two ends of which it is expelled by a piston moving in a horizontal direction.

[Printed, 9d. Drawings.]

A.D. 1860, May 11.—No 1172.

BROWN, WILLIAM, and MAY, CHARLES NEAL.—*Provisional protection only.*—This “invention relates to improvements in “machines for making bricks acting on the principle and in the “manner of machines patented by Mr. Joseph Pimlott Oates, “dated 9 October 1851, No. 13,769; 6 April, 1852, No. 14,054, “and the 15 March, 1854, No. 619, and consists” in certain modifications, separately enumerated in the specification, in the gearing, and other mechanism by which motion is communicated to the acting parts of the machines, and also in rendering the said machinery portable.

[Printed, 3d. No drawings.]

A.D. 1860, May 12.—No 1175.

BASFORD, WILLIAM.—Improvements in constructing brick walls and in forming and ornamenting the bricks.

1. These improvements consist in so building brick walls as to introduce upon one or both faces improved face bricks, to be of better quality than those forming the body of the wall, and ordinarily of the dimensions of a common header or stretcher brick, and from one to three inches in thickness. Thin headers can be introduced on one or both faces into a one-brick wall by making the common headers shorter and filling up the remaining space with the “header facing,” or by laying the stretchers a short distance apart, as if building a hollow wall and employing common bricks of the ordinary sizes only. In facing a half brick wall courses of the improved facing may be employed, having greater thickness than the other facing so as to form a bond; and the same or similar methods are applied to other thicknesses of brick-work.

2. Nine-inch walls faced with the improved header and stretcher facings, and constructed of improved bricks, measuring six inches by seven, and manufactured with hollows on one and on two faces.

3. Building with bricks rebated on the face at their ends and

beds, or at their ends only, and filling in the groove formed where two such rebates coincide with a slip or tile of brick, pottery, &c., so as to cover the joint between the two bricks.

4. Making ordinary bricks with grooves on one face to which a slab of the improved facing (formed with corresponding fillets on the back) is to be cemented to form a face brick.

5. Ordinary or improved face bricks with a recess on the face into which an ornament is to be inserted.

6. Combination of the improved end bricks with ordinary stretchers in the construction of walls, whenever the "improved" ends are narrower in the bed than the said ordinary stretcher "bricks."

[Printed, 1s. Drawings.]

A.D. 1860, May 24.—N° 1289.

NEWTON, WILLIAM EDWARD,—*a communication from Messrs. Souillard and Mazeline.*—This invention consists of improvements in the machinery or apparatus for mixing and moulding artificial fuel and applicable to bricks, for which Letters Patent were granted to the same inventor, 4th May 1858, N° 992. These improvements include "combining the mixing, softening, or heating operations" and the filling, moulding, and compressing operations in one "machine, and driving or actuating the several parts from one" and the same shaft; "they also provide for the introduction of steam into the cylinder when the materials are mixed, and the addition of a conical bottom and curved arms to that cylinder. To the filling apparatus is added a "rotating stirrer," and the mould wheel is fitted with a greater number of moulds than in the original arrangement.

[Printed, 1s. 4d. Drawings.]

A.D. 1860, May 31.—N° 1341.

ALDIN, CHARLES.—This invention consists of "the construction" of paving tiles with a span arched out or otherwise formed "hollow on the under surface thereof, so that they may rest upon" four or any other number of points or feet, and afford passage "for air under the remaining parts of the tile," for the purpose of ventilation and preventing damp from rising.

[Printed, 6d. Drawings.]

A.D. 1860, July 6.—N^o 1634.

GRIMSHAW, WESTON.—Improvements in machinery for compressing brick earth by the direct action of steam.

1. A mode of stopping the compressing piston so as to produce bricks all of an uniform thickness. The piston rod is made with a slot in it through which passes a fixed beam which arrests the piston when it has performed the requisite traverse; the position of the beam being adjustable to accommodate various thicknesses of bricks. The same object can be attained by making a shoulder on the piston rod which can be stopped by an adjustable beam.

2. "Admitting the exhaust steam to the top of the pistons for "bringing them down after each stroke.

3. "The application of a passage for the escape of steam when "the moulds are not properly supplied with clay."

These improvements are shown and described as applied to machinery in which the moulds are arranged in pairs, each having a loose plunger, and are fixed on a horizontal table having intermittent motion; the clay in them is first partially compressed by the upward stroke of a piston of a steam cylinder fixed under the table, and is then carried over a second or main cylinder, the piston of which completes the pressure. Plates perforated as described in the specification of Letters Patent granted to the same inventor May 30th 1859, N^o 1326, form a cover to the moulds while this is done. The further rotation of the mould table brings the moulds over a third piston which partly expels the bricks, and this is completed by the moveable plungers being caused to travel along inclined rails which gradually elevate them.

[Printed, 1s. 4d. Drawings.]

A.D. 1860, July 28.—N^o 1833.

HUNT, GEORGE CHARLES.—(*Provisional protection only.*)—Improvements in colouring bricks, tiles, and other similar articles the object apparently being to provide a method of rendering them permanently black. The articles are to be placed in a mixture consisting of oily or spirituous matters along with "carbonaceous, carbonizable, or bituminous matter, such as coal, "pitch, tar, resin, lampblack, or soot;" and the whole is to be heated till the articles are saturated, after which they are to be dried by heat.

[Printed, 8d. No drawings.]

A.D. 1860, August 11.—N° 1950.

HART, THOMAS.—Machinery for the manufacture of bricks in moulds. Clay or loam is fed into a hopper at the upper part of the machine, and in descending passes between a pair of rollers jagged on the surface, and a second pair of plain rollers. It is then formed into clods under the action of horizontal “stampers;” these are passed into cells or moulds formed round the periphery of a cylinder, which has a series of “double-headed pistons” within its interior and fitting the moulds, so that when a brick undergoes compression, the one in the mould opposite to it is expelled by the action of this double-headed piston. Each brick in turn receives pressure from a piston or stamper, the drum having intermitting motion given to it. In some cases clay may be fed to the mould cylinder by a screw or worm-wheel acting within a cylindrical channel in place of the system of pairs of rollers above described.

[Printed, 8d. Drawings.]

A.D. 1860, August 17.—N° 1994.

NEAME, JOHN AUSTIN.—(*Provisional protection refused.*)—This inventor declares “the nature of the said invention for improvements in manufacturing solid, hollow, or perforated bricks, socket, and other pipes, to be as follows:—It consists of reversed action of several helices, delivery on the incline, and otherwise.”

[Printed, 3d. No drawings.]

A.D. 1860, August 23.—N° 2030.

LILLIE, Sir JOHN SCOTT.—The object of this invention is to find a substitute for bricks or blocks of stone in “the manufacture of blocks for building purposes by mixing broken stone, bricks, flint, shingles, or other suitable materials, cast in moulds and united with bituminous compounds or other cements.”

[Printed, 3d. No drawings.]

A.D. 1860, August 28.—N° 2071.

EFFERTZ, PETER.—This invention relates to modifications and improvements upon machinery for making bricks which formed

the subject of Letters Patent granted to this inventor A.D. 1860, January 26, N° 201. The so "improved machinery for making bricks purifies, mixes, and raises the clay or other similar material by means of screwed or spiral knives, and presses the material so prepared into appropriate moulds." 1. Newly dug clay is fed into a hopper where it encounters beaters which partly prepare it and force it on to the spiral knives "which are enclosed in an elliptical vessel called an elevator, in which above the knives is a grate or grid, for the detention of stones and other objectionable matter." The knives raise the clay through this grate into a drawer which when full is moved horizontally over the mould placed by the side of the "elevator," and at the same height. A piston descends upon the drawer and fills the moulds with the clay, rises, and after the drawer has been removed descends a second time, "and when coming up again the bricks are raised in conjunction with a type which during the pressure forms the bottom of the moulds. The bricks are now pushed out by the again approaching drawer on to an endless apron."

2. Transport waggons to save manual labour in the transport of the moulded articles. "They consist of two moveable frames, the outside one of which is protected from injury by buffers, while the interior of the other frame is divided into endless aprons, which serve for the reception of the pressed bricks." The inner framing can be raised and lowered so that in filling a waggon each of these aprons is in turn brought to a level with the endless apron of the machine, and kept there till it is loaded with bricks.

These arrangements of machinery on this principle are shewn and described, they being intended for the daily production of from 20,000 to 25,000, from 40,000 to 50,000, and from 100,000 to 120,000 bricks, respectively, and two arrangements of the transport waggons are also described.

[Printed, 8s. 1d. Drawings.]

A.D. 1860, September 5.—N° 2142.

RANSOME, FREDERICK,—*Provisional protection only.*—This invention "consists in the application of rosin, shellac, and other gums or analogous substances insoluble in water, dissolved in alkaline or saline solutions," to stone, bricks, and other porous building materials, to preserve them; and also in the employment

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of these solutions for "cementing ground or pulverized stone, sand, and other matters to form or produce blocks and other articles." The solutions may be employed alone, or in combination with soluble silicates.

[Printed, 3d. No drawings.]

A.D. 1860, October 15.—N° 2507.

STEVENS, CHARLES, (*a communication from Louis Constant Desaint*).—"An improved machine for cutting out bricks and drain pipes" from calcareous or other stone.

"The machine is composed of a cogged driving wheel, which gearing with other cog-work, causes four drills to revolve, which bore the bricks, and of two pullies over which a ribbon saw passes, the pullies being put in motion by the gear-work above mentioned, the saw cuts out the bricks and pipes of any required size or shape, the drills above-mentioned perforating them with holes of any required diameter. The stone is placed on a carriage or slide which brings it within the action of the saw." "The machine is made to work in a receptacle filled with water."

[Printed, 6d. Drawings.]

A.D. 1860, October 26.—N° 2608.

BARFF, FREDERICK SETTLE.—1. This invention consists, firstly, in the manufacture of artificial stone by the combination in a cold state of pumice stone with soluble silicates, which are to be "combined with, or decomposed by, carbonate of lead, carbonate of zinc, or other suitable material insoluble in water which will decompose or chemically unite with the said silicates." Chalk, sand, or other similar substance may be added to diminish the cost of the compound.

2. Preserving building materials from decay by the application to their external surfaces of the said silicates and insoluble bodies.

[Printed, 3d. No drawings.]

A.D. 1860, November 7.—N° 2739.

CHURCH, JOHN.—*Provisional protection only*.—A brick and tile machine. In this machine two clay boxes are fixed a short distance apart each with its piston and mould. The two

pistons are connected together by a beam and worked simultaneously by the action of a rod. Clay is fed into each clay box at the top, and it is forced by the pistons through the moulds "in the form of bricks or tiles." The moulds, therefore, apparently must be moulding orifices or dies.

[Printed, 3d. No drawings.]

A.D. 1860, November 16.—N° 2311.

STEVENS, CHARLES, (*a communication from Count du Vigier and Viscount du Vigier de Mirabel*).—"Enamelled sheet-iron tiles" for roofing form the subject of this invention. They are to be grooved or corrugated over their entire surface, and turned up at one end and down at the other, each end being also bent; the edges of the tiles may also be so bent as to preserve the building from rain, &c. being driven in through the joints by the wind. These tiles are to be fixed together by means of hooks, and attached to the rafters by "iron nails or screws, or by a small metal band, to be hooked or nailed without being bent under the rafter." Tiles appropriately shaped for use at the hips and the ridge of the roof, piercing some of the tiles with holes to pass hooks for fixing ladders, and mixing sand with the enamel applied to the face of them, also form part of this invention.

[Printed, 9d. Drawings.]

A.D. 1860, November 23.—N° 2379.

HALE, THOMAS, and WALL, ARTHUR.—*Provisional protection only*.—This invention relates to improvements in furnaces and in the preparation of clays and bricks, and consists of,—

1. "Erecting in the furnace a series of two or more walls or partitions, with openings or perforations made in them, for the passage of smoke, gases, or vapours arising from the combustion of the fuel."

2. Adding "to clay in the process of manufacture a preparation of powdered asbestos, pumice stone, or the lava of volcanoes. magnesia, and bone ash." This preparation formed into a paste by the addition of carbonate of soda or potash and water can be applied as a coating to bricks, made either of common

prepared clay, or to the surface of any erections after building, to preserve them from the destructive action of fire or of the atmosphere.

[Printed, 3*d*. No drawings.]

A.D. 1860, November 26.—N° 2904.

SHARP, ISAAC, and BULMER, WILLIAM.—This invention consists of improvements in apparatus for the manufacture and the drying of bricks, tiles, and similar articles. 1. In making bricks, &c., the inventors cause the material to pass from the pug mill to moulds or moulding orifices through a channel, across which passes a shaft carrying two arms or “wipers;” these wipers are caused to actuate a bent lever, the longer arm of which forms a kind of valve in the channel; the wipers carried round by the rotation of the shaft bear the clay before them, and they are so arranged with relation to the lever, that as each wiper with clay approaches it, the valve shall open so as to guide the clay into the lower part of the channel, and immediately afterwards shall, by the further rotation of the shaft, be caused to close upon the clay, thus exercising a direct pressure, and driving it into or through the mould or die.

2. “The construction of drying sheds, with grooves or channels “formed at or in the sides thereof for the reception of moveable “shelves, upon which the articles to be dried are supported.”

[Printed, 2*s*. 4*d*. Drawings.]

A.D. 1860, December 7.—N° 3006.

MORRIS, WILLIAM, and RADFORD, JOB.—This invention relates to an improved composition to be employed in the manufacture of fire-bricks, &c., and for all the purposes for which ordinary fire clay is employed, and consists in mixing with common fire clay, marl, loam, clunch or other stiff clay, a proportion of pebbles, wholly or partially calcined and pulverized, or a certain stone found in the vicinity of Rednall, in Worcestershire, and termed “gravel rock,” and employed either pulverized or in its natural state. This stone, employed alone or in combination with the ground pebbles, can be employed as a substitute for emery.

[Printed, 3*d*. No drawings.]

A.D. 1860, December 8.—N° 3019.

NEWTON, WILLIAM EDWARD,—(*a communication from John Caswell, Adolphus Sinsheimer, and Oran William Seely.*)—Improved machinery for making bricks of dry clay under great pressure. This machine is fixed in a horizontal cast-iron frame, made in one rectangular casting, with a cross-piece forming part of it; to this cross-piece is attached a fixed bar having a piston at either end; two moveable pistons are also provided, one facing each of these fixed pistons, and these pistons form the sides of two brick moulds; the top and bottom of these moulds being formed of iron plates free to slide longitudinally and the ends alone being fixed.

From the face of each piston a metal plate called the "extension plate" can be caused to project, the end of which when drawn back is flush with and forms part of the compressing face. The two moveable pistons are connected and both move simultaneously and in the same direction, so that as one is approaching its fixed piston, whereby one mould is being contracted, the other is receding from the fixed piston which it faces so that its mould is expanded. In working, one of the moulds being at its greatest width and the top plate of it slidden back, clay is introduced; during this time the extension plates remain projected from the pistons, with the object of causing more clay to be deposited about the angles of the brick than at the sides of it.

The moveable piston being now caused to approach the fixed one and consolidate the clay, these "extension plates" are during the pressure drawn back, and at the same time the plate forming the top of the mould is slidden forward to close it, and during the pressure both the top and bottom plates are caused to slide past the brick, with the double object of expelling the contained air and of smoothing the faces of it.

The pressure being completed and the top and bottom plates of the mould slidden quite beyond the brick, a moveable platten rises from below as the pistons release the brick, lifts it vertically out of the mould, and thrusts it between two springs which hold it clear of everything. At a subsequent moment when the top of the mould is again covered these springs are forced open and drop the brick from between them for removal by hand. These operations go on as has been explained at either end alternately.

The motions are all derived from a main rotary shaft working across the head of the machine, the to-and-fro horizontal motions being obtained directly from an eccentric and a wheel keyed on to it, and the vertical lift of the plattens which expel the brick by the same motion communicated through "right-angled slotted levers," the fulcrum of which is at the angle, so that moving the one end horizontally shall cause the other to rise or fall. Most of the working parts of this machinery are separately claimed by the inventor.

[Printed, 11*d*. Drawings.]

A.D. 1860, December 17.—N^o 3101.

WALKER, THOMAS WEST.—This invention relates to improvements in the manufacture of inlaid ornamental tiles, bricks, &c., and a press for use in that manufacture. In manufacturing inlaid tiles according to this invention, a block of clay of one of the colours of the pattern is first taken, and the pattern is impressed or stamped on its surface; supposing the pattern only to contain two colours, a thin slice of clay of the other colour is next laid upon the face of the original block, and by the pressure of the same die portions of it are caused to enter into the hollows first formed; the superfluous parts of this slice of clay being cleared away, a piece of clay for forming the back or body of the tile is applied and incorporated with the mass below by pressure.

A cut is now made by a fine wire through the clay, at that part where the second coloured clay entered the original stamped pattern, and the finished tile is thus sliced off. When more than two colours are employed the ground of the pattern is formed by the original block of clay, and pieces of different coloured clay instead of one slice are laid in their proper places over the impressed or sunk parts, and caused by the die to enter those sunk parts.

According to another plan the coloured clay being in a box, a plate or die perforated with the proposed pattern is laid on it, and the "backing clay" for the body of the tile, made softer than that for the pattern, is laid upon this plate; the clay beneath this plate is now forced upwards, and passing through the apertures penetrates that above, a cut is now made just above the face of the pattern plate, and the expressed ornamental clay will show in the form of an inlaid pattern on the face of the backing clay.

The press described is a vertical hand-screw press fitted to receive the clay box and dies above described, and with arrangements for forcing up the clay box as required, which can be best understood by reference to the accompanying drawing.

The dies should be composed of hard and absorbent material, and a composition of flint and clay from which they may be made forms part of the invention.

[Printed, 10*d.* Drawings.]

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LONDON:

**Printed by GEORGE E. EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty.**

[Advertisement.]



PATENT LAW AMENDMENT ACT, 1852.

WORKS printed by order of THE COMMISSIONERS OF
PATENTS FOR INVENTIONS, and sold at their OFFICE,
25, Southampton Buildings, Chancery Lane, London.

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